

Appendix G: Marathon PGM-Cu Project Supporting Document - Geochemical Assessment of Mine Components (Ecometrix Inc.)

**ENVIRONMENTAL ASSESSMENT
FOR THE MARATHON PGM-Cu
PROJECT AT MARATHON, ONTARIO**

**MARATHON PGM-Cu PROJECT
SUPPORTING DOCUMENT -
GEOCHEMICAL ASSESSMENT
OF MINE COMPONENTS**

**STILLWATER CANADA INC.
1000, 715 Hewitson Ave
Thunder Bay, ON, P7B 4A3**



**STILLWATER
CANADA INC.**



Geochemical Assessment of Mine Components at the Marathon PGM-Cu Project

Report prepared for:

STILLWATER CANADA INC.
1005, 75 Hewitson St.
Thunder Bay, ON
P7B 4A3

Report prepared by:

ECOMETRIX INCORPORATED
6800 Campobello Road
Mississauga, Ontario
L5N 2L8

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Geochemical Assessment of Mine Components at the Marathon PGM-Cu Project

Michael Bower, M.Sc.
Project Scientist

Michael Venhuis, M.Sc., P.Geo.
Project Manager

Ronald Nicholson, Ph.D.
Project Principal

EXECUTIVE SUMMARY

The Marathon PGM-Cu project requires an environmental assessment to gain regulatory approval. The Project includes plans to mine a copper-PGM deposit near Marathon, Ontario. The ore deposit contains sulphide mineral and therefore the mine materials require a detailed assessment of potential effects on the environment, including the potential for mine waste to generate acid and/or be subject to metal leaching. The objective of this investigation was to assess the characteristics of mine rock and process solids that will be produced in the operation and will be permanently stored in various mine components on site. The results of this investigation were intended to provide estimates of loadings of constituents of potential concern (COPC) from mine materials that will then be applied to water quality calculations after a water balance for the site has been defined with some confidence. The results of this report will form the basis of water quality calculations to feed the inputs for the effects assessment.

The Project includes plans to produce almost 300 Mt of mine rock, most of which will contain very low sulphur values and can safely be stored in mine rock stockpiles adjacent to the open pits. Approximately 60 Mm³ of process solids will be produced after milling of the ore. Although the process solids will have a relatively low sulphur content of about 0.5%, preliminary assessment of this material suggested that the process solids, if not managed appropriately, could generate acid in an on-land impoundment exposed to the atmosphere. In order to prevent acid generation, sulphur will be removed from the process solids after milling and 90 to 95% of the process solids will have a low sulphur content of less than 0.3% S. Between 5 and 10% of the solids will have a higher sulphide content and will be stored underwater either below the water table in the low sulphur process solids management facility or in a pond or open mine pit to prevent oxidation and acid generation. The mine materials test program in this investigation therefore focused on the assessment of mine rock in stockpiles, low sulphur process solids in an on-land impoundment, high sulphur process solids underwater and pit walls exposed to air above the flooded pit water level. Tests were designed to provide estimates of loading rates for COPCs under the proposed storage conditions.

The program results lead to the following conclusions;

- mine rock with a sulphur content that is less than 0.3% S will not generate acid and can be safely stored in on-land stockpiles,
- mine rock materials with a sulphur content greater than 0.3% sulphur represents only 6% of the total inventory and can be managed to prevent effects on the environment;
- the low sulphur process solids do not represent a risk of acid generation and can be stored safely in an on-land impoundment; and

- loading rates for COPC for materials have been quantified and will be used to estimate water quality concentrations when water balance estimates have been finalized.

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ACRONYMS AND ABBREVIATIONS

AAS	Atomic absorption spectrometry
ABA	Acid-base accounting
AES	Atomic Emission Spectrometry
AP	Acid Production Potential
ARD	Acid rock drainage
BHP	BHP Engineering Pty Ltd.
BMA	Bulk mineral analysis (QEMSCAN)
Carb-NP	Estimated neutralization potential from measured carbonate content
CARs	Canadian Aviation Regulations
CEA Agency	Canadian Environmental Assessment Agency
COPC	Contaminant of potential concern
Cu	Copper
DL	Detection Limit
EA	Environmental Assessment
EIS	Environmental Impact Statement
Fe	Iron
HC	Humidity Cell
HFO	Hydrous ferric oxides
HO	Harmonization Order
Hwy	Highway
ICP	Inductively-Coupled Plasma
JRP	Joint Review Panel
LCT	Lock-cycle test
LOM	Life of mine
m	Metre
ML	Metal leaching
MPGM	Marathon PGM Corp.
MPI	Marathon Pulp Inc.
MRSA	Mine Rock Storage Area
MS	Mass Spectrometry
NAG	Net acid generation
NoC	Notice of Commencement
Non-PAG	Non potentially acid-generating
NP	Neutralization Potential
NPR	Net Potential Ratio = NP/AP
O. Reg.	Ontario Regulation
OEA Act	Ontario Environmental Assessment Act
OMOE	Ontario Ministry of the Environment
PAG	Potentially acid-generating
PGE	Platinum Group Element
PGM	Platinum Group Metal

PSMF	Process Solids Management Facility
PWQO	Provincial Water Quality Objective
QA/QC	Quality Assurance Quality Control
S	Sulphur
SCI	Stillwater Canada Inc.
SFE	Shake Flask Extraction
SFI	Sustainable Forest License
SO ₄ ²⁻	Sulphate
SWC	Stillwater Mining Company
ToR	Terms of Reference
VA	Voluntary Agreement
XRD	X-ray diffraction

1.0 INTRODUCTION

Stillwater Canada Inc. (SCI) proposes to develop a platinum group metals (PGMs), copper (Cu) and iron (Fe) open-pit mine and milling operation near Marathon, Ontario. A Notice of Commencement (NoC) of an environmental assessment (EA) in relation to the proposed Marathon PGM-Cu Project (the "Project") was filed by the Canadian Environmental Assessment Agency (CEA Agency) under Section 5 of the *Canadian Environmental Assessment Act* on April 29, 2010 (updated July 19, 2010). The EA was referred to an independent Review Panel by the Minister of the Environment on October 7, 2010. On March 23, 2011 SCI entered into a Voluntary Agreement (VA) with the Province of Ontario to have the Project subject to the Ontario Environmental Assessment Act (OEA Act). This agreement was the instrument that permitted provincial government to issue a Harmonization Order (HO) under Section 18(2) of the Canada-Ontario Agreement on Environmental Assessment Cooperation to Establish a Joint Review Panel for the Project between the Minister of the Environment, Canada and the Minister of the Environment, Ontario. The HO was issued on March 25, 2011. The Terms of Reference (ToR) for the Project Environmental Impact Statement (EIS) and the agreement establishing the Joint Review Panel (JRP) were issued on August 8, 2011.

The following provides an overview of the proposed development including its location, surrounding land uses, the exploration history of the site and the primary features of the mining and milling facilities.

1.1 Project Location

Stillwater Canada Inc.'s Marathon PGM-Cu Project is located approximately 10 km north of the Town of Marathon, Ontario (Figure 1.1). The town, population approximately 4,000, is situated adjacent to the Trans-Canada Highway (Hwy 17) on the northeast shore of Lake Superior, about 300 km east and 400 km northwest (by highway) of Thunder Bay and Sault Ste-Marie, respectively.

The center of the Project footprint sits at approximately 48° 47' N latitude, 86° 19' W longitude. The Project site is in an area characterized by relatively dense vegetation, comprised largely of a birch- and, to a lesser extent, spruce-dominated mixed wood forest. The terrain is moderate to steep, with frequent bedrock outcrops and prominent east-west oriented valleys. The climate of this area is typical of northern areas within the Canadian Shield, with long winters and short, warm summers.

1.2 Surrounding Land Uses

The Project site lies partially within the municipal boundaries of the Town of Marathon, as well as partially within the unorganized townships of Pic, O'Neil and McCoy. The primary zoning designation within the Project Site is "rural".

In the immediate vicinity of the Project there are several authorized aggregate sites, including SCI's licensed aggregate site located to the east of Hwy 17 along the existing site access road.

The Marathon Municipal Airport (CYSP), which operates as a Registered Airport (Aerodrome class) under the Canadian Aviation Regulations (CARs; Subsection 302), is adjacent to, and south of the Project site. The airport occupies a land area of approximately 219 hectares and is accessed from Hwy 17.

Several First Nations and Métis groups claim the Project site as falling within their traditional land use boundaries, though no formal land claim for the area has been accepted by the Canadian government at this time. Historically, as is the case today, land and water uses associated with (or close to) the site would have typically been limited to the Pic River corridor, the Bamoos Lake-Hare Lake-Lake Superior corridor and the Lake Superior shoreline and near-shore area, rather than the interior of the Project site. Traditional land and water uses (or rights conferred by Treaty) that can be ascribed to the site include:

- Hunting;
- Trapping;
- Fishing;
- Plant harvesting for food (e.g., blueberries) or cultural/medicinal uses; and
- Occupancy.

Primary industries supporting the Town of Marathon, as well as the region, have historically been forestry, pulp and paper and mining. The Project site is located within the Big Pic Forest Management Area. The Big Pic Forest includes Crown land east and north of Lake Superior and is generally north, south and west of the community of Manitouwadge and includes the communities of Marathon, Caramat and Hillsport. Until July 2010 the forest was managed under the authority of a Sustainable Forest License (SFL), which was held by Marathon Pulp Inc. This SFL was revoked, with the forest reverting to the Crown as a Crown Forest. Until recently, Marathon Pulp Inc. (MPI) operated a Kraft pulp mill in Marathon on the shore of Peninsula Harbour. The mill announced its indefinite shut down (effective at the end of February 2009) on February 11, 2009, and as a result there has been a significant downturn in the local economy. The Hemlo Mining Camp is located 30 km to the southeast. There are currently two mines in production at the Camp (David Bell Mine, Williams Mine).

1.3 Exploration History of the Site

Exploration for copper and nickel deposits on the Project site started in the 1920s and continued until the 1940s with the discovery of titaniferous magnetite and disseminated chalcopyrite occurrences. During the past four decades, the site has undergone several phases of exploration and economic evaluation, including geophysical surveys, prospecting, trenching, diamond drilling programs, geological studies, resource estimates,

metallurgical studies, mining studies, and economic analyses. These studies successively enhanced the knowledge base of the deposit.

In 1963, Anaconda acquired the Marathon property and carried out systematic exploration work including diamond drilling of 36,531 m in 173 drill holes. This culminated in the discovery of a large copper-PGM deposit. Many of the holes were drilled in areas off the present Marathon property. Anaconda carried out a test pitting program that recovered 350 tonnes of material and had it tested at its Extraction Metallurgy Research Division (EMRD) facilities. Anaconda conducted a number of metallurgical tests intermittently from 1965 to 1982. Anaconda's primary objective was to improve metallurgical recoveries of copper and increase the copper concentrate grade. Anaconda discontinued further work on the project in the early 1980s due to low metal prices at the time.

In 1985, Fleck purchased a 100% interest in the Marathon PGM-Cu Project with the objective of improving the project economics by focusing on the platinum group element (PGE) values of the deposit. Fleck carried out an extensive program which included re-assaying of the Anaconda drill core, further diamond drilling, surface trenching of the mineralized zones, bulk sampling and a pilot plant test program at Lakefield Research Limited. The Fleck drilling totaled 3,615 m in 37 diamond drill holes. On June 10, 1998, Fleck changed its name to PolyMet Mining Corp.

In 1986, H.A. Symons carried out a feasibility study for Fleck based on a 9,000 tonnes per day conventional flotation plant with marketing of copper concentrate. The study indicated a low internal rate of return. Also in 1986, Kilborn Limited carried out a prefeasibility review for Fleck that included preliminary results from the Lakefield pilot plant tests. The study envisaged a 13,400 tonnes/day conventional flotation plant with marketing of copper concentrate. In late 1986 Teck Corporation prepared a preliminary economic feasibility report on Fleck's Marathon PGM-Cu Project based on a conventional open pit operation and concluded that the project was uneconomic due to low metal prices at that time.

In 1989, BHP Engineering Pty Ltd. (BHP) carried out a prefeasibility study for Euralba Mining Ltd. (Euralba), an Australian Junior mining company that had entered into a joint venture agreement with Fleck in 1987. Euralba re-sampled some 2,500 samples of drill core and had them assayed at Lakefield. Euralba retained Geostat Systems International (Geostat) to develop a block model of the Marathon deposit that was used by BHP to design an optimized open pit. BHP considered several metallurgical processes, including an on-site smelter process.

In 2000, Geomaque acquired certain rights to the Marathon PGM-Cu Project through an option agreement with Polymet. Geomaque and its consultants carried out a study of the economic potential of the Marathon PGM-Cu Project. The study included a review of the geology and drill-hole database, interpretation of the mineralized zones, statistics and geostatistics, computerized block model, resource estimation, open pit design and optimization, metallurgy, process design, environmental aspects, capital and operating cost.

Marathon PGM Corp. (MPGM) acquired the Marathon PGM-Cu deposit from Polymet in December 2003. MPGM funded programs of advanced exploration and diamond drilling on a continuous basis between June 2004 and 2009. Over this period a total of 100,694 metres was drilled in 511 holes. Drilling was conducted across the Project site for various purposes including: to upgrade or expand the resource; for condemnation holes at the process solids management area, crusher and mills sites; and, to further define the resource, improving drill density and to reduce the strip ratio of the planned open pits. MPGM did not drill any holes in the Project area during 2010.

Stillwater Mining Company (SWC) and Marathon PGM Corp. entered into an agreement on September 7, 2010 pursuant to which SWC would acquire all of the outstanding shares of MPGM. The acquisition agreement received ministerial approval under the Investment Canada Act on November 24, 2010 and the agreement closed on November 30, 2010. On December 31, 2010 Stillwater Mining Company formed a Canadian corporation, Stillwater Canada Inc. (SCI), who officially became the new proponent of the Marathon PGM-Cu Project. In 2011, SCI drilled 25 holes totalling 6,550 metres at the Marathon PGM-Cu deposit. Of the 25 holes, nineteen were drilled to improve the ore zone definition within the potential open pit, and six holes were drilled beneath the planned process water treatment plant to evaluate the nature of the rock and to test the size of a small sulphide zone.

1.4 Project Overview

The Project consists of the development of an open pit mining and milling operation. One primary pit (approximately 2 km in length, 600 m maximum width and 340 m maximum depth) and smaller satellite pits will be mined. Ore will be processed (crushed, ground, concentrated) at on-site processing facilities. Final concentrates containing copper, platinum group metals (gold, platinum, palladium) and iron will be transported off-site via road and/or rail to a smelter and refinery for subsequent metal extraction and separation. The total mineral reserve is estimated to be about 91 million tonnes.

Mine construction is anticipated to begin in 2013. During the operations phase of the Project, production will be on average approximately 22,000 tonnes per day. The operating life of the mine is proposed to be 11.5 years. A construction workforce of about 400 people will be required for between 18 and 24 months. The mine will create as many as 350 full time positions during the height of operations. The mine workforce will reside in local and surrounding communities, as there will be no living facilities on-site.

Approximately 288×10^6 tonnes of mine rock¹ will be produced and permanently stored in a purposefully built Mine Rock Storage Area (MRSA) located east of the main pit. Low-sulphur, non-acid generating and non-metal leaching mine rock will be used in the construction of access roads, dams and other site infrastructure as needed. Process

¹ Mine rock is rock that has been excavated from active mining areas but does not have sufficient ore grades to permit economically viable extraction.

solids² will be managed in the Process Solids Management Facility (PSMF). The PSMF will be designed to hold approximately $61 \times 10^6 \text{ m}^3$ of process solids material. Creation of the PSMF will require the construction of a number of dams. Water collected in the PSMF, as well as water collected around the mine site (e.g., water pumped from the pits), will be directed to a Process Water Pond for eventual reclamation in the milling process. Excess water not needed in the mill will be discharged (monitored and controlled) to the environment through an existing surface water course after meeting federal and provincial requirements.

Access to the Project site is currently provided by the Camp 19 Road, opposite the Peninsula Road at Highway #17. The existing road runs east towards the Pic River before turning north along the river to the Project site (approximately 8 km). The existing road will be upgraded and utilized from its junction with Highway #17 for approximately 1.0 km. At this point a new road running north will be constructed to the future plant site. The primary rationale for developing the new road is to move traffic away from the Pic River, where erosion of the existing road is a safety and environmental concern. The new section of road will link two sections of abandoned forest access roads located on the site.

Power to the Project site will be provided via a new 115 kV transmission line that will be constructed from a purposefully built junction point on the Marathon-Manitouwadge transmission line located to the northwest of the primary pit. The new transmission line will run approximately 3.8 km to a transformer station at the mill site. The width of the transmission corridor will be approximately 30 m.

Disturbed areas of the Project footprint will be reclaimed in a progressive manner during all Project phases. The ultimate goal of mine decommissioning will be to reclaim land within the Project footprint to permit future use by resident biota and for traditional land-use activities. A certified Closure Plan for the Project will be prepared as required by Ontario Regulation (O.Reg.) 240/00 as amended by O.Reg.194/06 "Mine Development and Closure under Part VII of the Mining Act" and "Mine Rehabilitation Code of Ontario".

Maps showing the existing features and topography of the site, as well as the proposed development of the site are provided in Figures 1.2 and 1.3.

² Process solids are solids generated during the ore milling process following extraction of the ore (minerals) from the host material.

1.5 Background Information Related to Mine Component Geochemistry

1.5.1 Geology

1.5.1.1 Regional Geology

The Marathon project is located within Eastern Gabbro Series of the Coldwell Complex that is characterized by alkalic plutonic rocks that are estimated to be about 1 billion years old (Micon, 2010). The Eastern Gabbro is part of a large magmatic system that is up to 2 km thick and extends about 30 km along the eastern margin of the Complex and contains numerous copper-PGM anomalies.

1.5.1.2 Project Site Geology

The Marathon PGM-Cu deposit is part of a large magmatic system that was formed by at least three events of intrusion by olivine gabbro units. Mineralization is predominantly associated with the Two Duck Lake (TDL) Gabbro that was a later intrusive event. The TDL Gabbro can be traced over a continuous length of about 6 km.

The TDL Gabbro is in contact and generally overlies intermediate pyroclastic rocks that were partially melted during the intrusion by the gabbro. These are referred to as the footwall rock and consist of fine to coarse grained gabbroic material with quartzite, pyroxenite and layered quartz pyroxenite (Micon, 2010).

Sulphide minerals in the TDL Gabbro are dominated by chalcopyrite and pyrrhotite with minor quantities of pentlandite, cabalite, bornite and pyrite. The sulphides occur within the silicate matrix as well as in association with secondary calcite and hydrous silicate minerals such as chlorite and serpentine (Micon, 2010). Chalcopyrite, that is the primary copper ore mineral, occurs as separate grains or as replacement rims on pyrrhotite grains. The sulphide assemblage varies through the deposit with predominantly pyrrhotite with minor chalcopyrite at the base changing to predominantly chalcopyrite with little to no pyrrhotite at the top of the mineralized zone. The West Horizon zone contains sulphides that are dominated by chalcopyrite and bornite with minor proportions of pentlandite, cobaltite, pyrite and pyrrhotite.

The mineralization in the Marathon deposit consists of several large, thick zones of disseminated sulphides within the TDL Gabbro. The mineralized zones generally occur as shallow dipping lenses that follow the basal contact between the gabbro and footwall rocks.

While the copper mineralization is associated with the sulphide zones, the PGMs are associated with both sulphides and other minerals such as boundaries of plagioclase and within hydrous silicates such as chlorite and serpentine. There is generally a poor to no correlation between copper content and the combined contents of palladium, platinum and gold.

1.5.1.3 Deposit Mineralogy

A mineralogical assessment of the mine rock material used in the ten kinetic humidity cell tests was conducted by Golder (2008) in order to assess the general characteristics of the rock types constituting the Marathon PGM-Cu site. The material in the humidity cells was evaluated by both quantitative X-Ray Powder Diffraction (XRD) using the Rietveld method and petrographic examination of polished thin sections.

The XRD analysis indicated that the most prevalent mine rock mineral is plagioclase. The Two Duck Lake Gabbro and the Eastern Gabbro also had fair occurrence of diopside and quartz, and many of the rock types also had moderate to minor portions of amphibole and ferrosparite. The Two Duck Lake Gabbro, Eastern Gabbro, and Volcanic/Footwall Breccia all contained minor amounts of sulphide minerals, such as pyrrhotite, chalcocopyrite, and to a lesser extent pyrite. Bornite and covellite were also detected during the XRD analysis. Trace amounts of calcite and dolomite were also sporadically detected in the various rock types. The XRD results of the ten mine rock samples are shown in Figure C1 to C10, and a qualitative summary of the XRD results is compiled in Table 2 in Golder (2008). Four photographs of polished thin sections further demonstrate the occurrence of sulphide and carbonate minerals in the mine rock material.

An XRD analysis of a single bulk process solids sample by Golder (2008) was also completed on the 2004 SGS metallurgical sample. The mineralogical signature for the process solids was similar to the mine rock material, consisting predominantly of plagioclase with moderate amounts of diopside. The process solids sample also had minor to trace amounts of clays, micas, and magnetite. In general, the sample was characteristically similar to the parent mine rock material, except with lesser amounts of sulphide minerals. The XRD scan of the process solids sample is shown in Figure C11 in Golder (2008).

A metallurgical study of a sample of process solids from the 2008 XPS metallurgical sample was also completed by G&T Metallurgical Services Ltd. (2009) to address the potential to recover sulphide minerals from the process solids. As part of the study, the sample was also evaluated for its sulphide mineral contents in the feed and test products.

The feed sample provided by XPS contained approximately 0.7 %S, which was mostly in the form of pyrrhotite, with minor amounts of pyrite, chalcocopyrite, pentlandite, and sphalerite. Pyrrhotite in the feed sample represented approximately 88% of the sulphide minerals present, whereas copper sulphides and pyrite only comprised about 8% of the sulphide minerals present.

Additional mineralogical assessment of the process solids sample indicated predominant amounts of feldspars, pyroxene, hornblende, micas, and some titanium minerals, such as Ti-hematite, ilmenite, sphene, and rutile/anatase. Other minerals were also noted in the study according to size fraction, as illustrated in G&T Metallurgical (2009).

1.5.2 Overview of Sulphur in Process Solids and Mine Rock

The ore and surrounding rock contain sulphide minerals. Sulphide minerals are known to oxidize and can potentially leach metals or produce acid when exposed to air in the atmosphere if they occur in sufficient concentrations in mine rock and process solids.

The sulphur content of the majority of mine rock will be very low and no effects are anticipated when that material is stored in on-land stockpiles that are common at mining operations. Some mine rock will have higher concentrations of sulphide minerals and that material will be identified during mining and will be managed to avoid release of metals or acid to the environment.

Much of the sulphide mineral content in the ore will be removed in the mill and collected as concentrate that represents the mineral value of the deposit. Some sulphide minerals will remain in the process solids after milling with potentially enough sulphide to result in metal leaching and acid generation if not properly managed. The process solids will therefore be managed to prevent acid leaching and acid generation over the long term by removing sulphur from the Bulk process solids and appropriate storage of the smaller volume of high sulphur process solids.

Two process solids management options have been proposed. Both options have a focus on the prevention of sulphide mineral oxidation, metal leaching and acid generation. The options were presented to allow a comparison project footprint areas, dam locations, design and cost. Both options are technically feasible and can achieve the desired results for long term geochemical stability for process solids. The main features of the options that relate to the assessment of water quality associated with each option are presented below. Both options are based on the removal of the residual sulphide minerals from the process solids so that the remaining sulphide content is too low to represent a source of acid or metal leaching. The high sulphide mineral fraction would represent 5 to 10% of the total mass of process solids and will require special management while the low sulphide process solids can be placed in a traditional on-land impoundment. The preferred mode of managing high sulphide process solids is to store material under water to prevent contact with atmospheric oxygen.

The “South Option” includes the management of the high sulphide process solids underwater in an engineered pond that will remain as a pond behind a low dam during operation and after mine closure. Option 3 includes the deposition of the high sulphide process solids in a cell behind a low dam within the low sulphur process solids impoundment during the operation until one of the satellite pits has been mined out and is available for tailings storage. At that time, the discharge of high sulphide process solids will be relocated to the satellite pit for underwater storage. The high sulphide solids in the engineered cell will then be covered by low sulphide process solids and will remain permanently “under water” below the water table and covered by the low sulphide solids that will be re-vegetated after closure. The main differences between these options are as follows;

- the South Option will have a permanent pond over high sulphide process solids and behind a low dam after closure;
- Option 3 will have no pond behind dams after closure, and;
- both options will have water filled pits but some volume of Satellite Pit No. 1 will be occupied by high sulphur process solids in Option 3.

The project features and proposed mine components provide the framework for the required assessment of water quality during operations and after mine closure. The interactions between natural water drainages with mine components may result in changes in water chemistry. The focus of this investigation was therefore on the assessment of chemical interactions and the evaluation and quantification of releases from mine materials that will influence water quality at the site. The assessment therefore included the consideration of:

- mine rock in on-land stockpiles;
- low sulphide process solids in an on-land impoundment;
- high sulphide process solids underwater;
- pit wall rock material above water in the flooded pits after closure; and,
- process water from the mill during operations.

1.5.3 Summary of Previous Mine Component Testing

Exploration drilling at the project site has been extensive. Drill core samples have been analysed for elements of economic interest and many samples have been analysed for sulphur to develop a better understanding of the sulphide content of the ore zone and surrounding material that may be removed as mine rock. Environmental testing of the rock from the Marathon project site was first reported in 2001 (B.C. Research, 2001) for former owners of the property followed by additional work in 2005 (NAR, 2005) for Marathon PGM. More intensive environmental testing was started in 2007 and reported by Golder (2008). The more recent investigations included a review and assessment of geology, chemical analyses of rock, including acid base accounting (ABA) and the initiation of several kinetic tests that involved humidity cell testing on selected rock samples. A pilot metallurgical test by SGS in 2004 produced process solids that were also tested as part of the recent investigation. The following section provides a summary of the previous investigations and key findings that were used to guide the ongoing investigations focused on the assessment of water quality effects from project interactions with the environment.

1.5.3.1 Mine Rock

The two major rock types were identified as the Eastern Gabbro and the Two Duck Lake Gabbro, representing 44-52% and 27-29% of the estimated mine rock at the project site, respectively (Golder, 2008). The four minor rock types were identified as the Volcanic³ representing 14-18%, the Heterolithic Breccia representing 0.3-12%, the Syenite representing 0.6-4%, and Serpentine representing less than 1% of the overall rock. The proportions of the various rock types, as determined by Golder (2008), were updated and improved by employees of Marathon PGM-Cu in mid-2009 based on additional rock core data and further interpretation of the site geology. The updated estimates for the proportion of each rock type are discussed in more detail in a later section of this report.

The primary mineralogical assemblage in the deposit consists of plagioclase, and to a lesser degree diopside, quartz, and amphibole (Golder, 2008). The sulphide minerals in the various rock types were mostly pyrrhotite, chalcopyrite, and pyrite. Carbonate minerals, generally calcite and dolomite, were also detected in trace amounts. In general, it was concluded that most of the mine rock will not be acid generating, but with a potential that roughly 7% of the mine rock material could be acid generating (Golder, 2008). Based on the ABA results of 114 rock samples submitted for analysis, the volcanic rock type was determined to pose the most significant potential for acid generation with approximately 40% of the samples exceeding the proposed sulphide content cut-off of 0.3 wt% as S (Golder, 2008). The Heterolithic Breccia rock type had approximately 33% of samples above the 0.3 % S, followed by the Eastern Gabbro at approximately 7% and the Two Duck Lake Gabbro at approximately 6% of the samples. The syenite and serpentinite samples were all deemed as non-acid generating. Furthermore, based on net acid generation (NAG) testing, the majority of samples will not be acid generating, even in cases when the sulphide content exceeds 0.3 wt% as S due to an abundance of neutralizing minerals. The NAG results suggested that samples with sulphide contents greater than 0.5 wt% S may have the ability to generate acidic conditions (Golder, 2008).

A “modified” Synthetic Precipitation Leaching Procedure (SPLP) was used to simulate what potential constituents in the sample’s leachate were readily soluble. The “modified” SPLP test was conducted as outlined by the U.S.EPA (1998), with a minor change of using a 3:1 liquid to solids ratio, instead of the traditional 20:1 liquid to solids ratio to reduce dilution and improve assessment of the constituents of potential concern (COPC). This results of this testing suggest that several metals, including aluminum (Al), boron (B), chromium (Cr), cobalt (Co), copper (Cu), iron (Fe), lead (Pb), silver (Ag), vanadium (V) and zinc (Zn) may have specific effects on the overall water quality of the site and should be carefully monitored throughout the mine rock investigation (Golder, 2008). It was also demonstrated by the metal analysis of the NAG supernatant that constituents, such as Al, cadmium (Cd), Co, Cr, Cu, Ni, Zn, and to lesser extent B, Fe, Pb, and thallium (Tl), should also be

³ The Volcanic rock type has also been described as Footwall Breccia (RIB). The term Volcanic has been used in this report to remain consistent with descriptions used in previous investigations.

evaluated and monitored as COPC's for the overall site water quality. Lastly, analysis of the leachate from the humidity cell tests suggested that Al, arsenic (As), Cu, and to a lesser extent Cd and uranium (U) may be of concern to the overall water quality as their concentrations were greater than the PWQOs during the 56 week test period for humidity cells (Golder, 2008). However, as many of these kinetic tests that were initiated by Golder continued well beyond the 56 week mark, including two tests that extended for 148 weeks, a more detailed and representative analysis conducted by EcoMetrix will be a major focus of this report.

1.5.3.2 Process Solids

A process solids sample was produced in 2004 by SGS Lakefield in Ontario, Canada in conjunction with Marathon PGM-Cu's metallurgist for geochemical characterization and testing. The one combined process solids (tailings) sample consisted of a rougher and cleaner process solids combined as a by-product from the processing of the average grade ore. The combined process solids sample was the only process solids sample subjected to kinetic testing, as well as qualitative X-Ray Diffraction (XRD) analysis, whole rock analysis, bulk metal analysis, decant water analysis, and short-term leach tests (Golder, 2008). Overall, both the ABA and NAG testing suggest that most of the process solids material that will potentially be produced will not be acid generating. However, based on some NAG results, it was tentatively concluded that there was a potential for some of the process solids to be acid generating if sulphide minerals had not been removed from the bulk solids (Golder, 2008).

Short-term leach tests and analysis of the NAG supernatant both indicate that there are several metals that will need to be monitored and evaluated for their potential effects on the overall water quality. Short-term leach testing suggests that leached metal concentrations for Al, Ag, B, Co, Cr, Cu, Fe, Pb, V, and Zn may exceed water quality specifications and should be further analysed. Additionally, the analytical results for the NAG supernatant suggests that metals, such as Al, Cd, Co, Cr, Cu, Ni, Zn, and to a lesser extent B, Fe, Pb, and Tl may be an issue for maintaining the goals set forth by the water quality guidelines.

The one kinetic test of the combined process solids sample of average ore grade indicate that leached metal concentrations of Al, Cu, and Mo occurred at levels greater than their PWQOs at some point during the 36 week test period (Golder, 2008). Again, the kinetic testing of the combined process solids material was continued beyond the 36 week period investigated by Golder and was further evaluated by EcoMetrix until the termination of the humidity cell at week 50. Further analysis and interpretation of the findings from the combined process solids humidity cell is discussed in greater detail later in this report.

1.5.3.3 Process Water

The water quality analysis of the process solids decant shows that total concentrations of Al, As, Cd, Cr, Co, Cu, Fe, Pb, Mo, Ni, Ag, V, and Zn in the "mill process" water were greater than the PWQOs. The dissolved concentrations of Al, Cr, Fe, Mo, and Zn were also

greater than the PWQOs. The total and dissolved concentrations associated with the decant process solids water from the SGS 2004 metallurgical study are present in **Table 1.1**. Although it is not practical to directly compare process solids decant chemistry to PWQOs, comparisons to PWQOs provide screening level insight regarding parameters for which aqueous geochemistry may be an important consideration.

1.6 Objective and Scope of the Current Report

Marathon PGM-Cu initiated several investigations to assess the geochemistry and leaching behavior of mine rock and process solids (commonly referred to as tailings) and to predict water quality associated with the various mine components. Preliminary investigations into the characteristics of mine materials and the influence on site water quality were initiated in 2007 and reported in Golder (2008). EcoMetrix Incorporated (EcoMetrix) initiated a number of investigations since 2008 to further the geochemical assessment of mine materials. Additional investigations included humidity cell tests on low-sulphur process solids, and column tests on submerged Bulk and high-sulphur process solids.

The objective of this investigation was to evaluate the geochemical characteristics of mine materials and to quantify constituent loadings from mine materials and components that are needed to assess water quality at the proposed mine. This evaluation included mineralogical and chemical characterization of the various rock types, static acid-base accounting (ABA), and kinetic studies that involved column tests with submerged materials, humidity cell tests, and short term leach tests (SPLP). Scenarios of mine rock stockpiled on-land, low-S processed solids stored behind dams on-land, high-S processed solids stored below the water table and under water in a pond or flooded pit, and open pit rock walls were considered. The various investigations were completed to allow an evaluation of water quality of the effluent discharge and site drainage to the surrounding water sheds during operation and past closure.

1.7 Report Format

Following this introductory section, the remainder of the current report is organized as follows:

- Section 2.0 provides an overview of the mine components;
- Section 3.0 discusses the methods by which mine component material was characterized and by which mine component chemistry and loading rates were derived;
- Section 4.0 outlines the results and discussion;
- Section 5.0 provides the conclusions and recommendations for further work; and

- Section 6.0 provides a list of the references cited in the preparation of this report.

Additional relevant data and information are provided for reference in Appendices 1 through 4.

2.0 OVERVIEW OF MINE COMPONENTS

The primary mine components were evaluated as part of this geochemical investigation: the mine rock in on-land stockpiles, the rock in the open pits, the low sulphur process solids in the on-land impoundment, the subaqueous high sulphur process solids either in a storage pond or satellite pit and process water from the mill during operation. The following sections discuss the various mine components in the context of potential effects on water quality and present an overview of information required for the estimation of loadings of COPCs.

2.1 Mine Rock

One mine rock stockpile is proposed, just to the east of the primary open pit. The material permanently stored in the Mine Rock Storage Area (MRSA) will encompass approximately a 150 ha footprint. The MRSA has the capacity to store all of the mine rock generated during the 11.5 year mine life.

2.2 Process Solids

The process solids generated during the life of the mine will be separated according to their sulphur contents, with the low sulphur and high sulphur materials managed individually. The process solids will be concentrated and separated into low sulphur and high sulphur streams after the milling process, and delivered to their respective storage facilities. Two process solids storage options have been proposed.

South Option

The South Process Solids Management Facility (South PSMF) option includes two engineered storage areas and necessarily requires the segregation of low- and high-sulphur material. Low- and high-sulphur materials will be produced at the mill site via flotation, with the separate process solids streams directed to their respective storage areas. The primary storage area comprises a 145 ha area immediately west of the open pits. This area will be designed to hold approximately 55 Mm³ of low-sulphur process solids material. The area will be filled from west to east. A series of impervious dams will be created around the low-sulphur storage area for containment. The highest of these dams will be raised at its final elevation to 89 m above current ground level, or 384 masl. The highest elevation of the adjacent topography is 396 masl. A second storage area will be created to the southwest of the open pit and will be dedicated to the relatively high-sulphur process solids. This area will have a footprint of about 59 ha and a storage capacity of 6 Mm³. Material in this area will have a permanent water cover (3 m) to prevent acid generation or metal leaching. Impervious dams will also be created around the high-sulphur storage area, although the process solids stored under the water cover here will largely be contained by natural topography. The highest of the dams to be raised at the high-sulphur storage area will be 20 m above current ground level, or 319 masl. The highest elevation of the adjacent topography is 332 masl. This dam is at the west end of

the high-sulphur storage area and corresponds to the location where excess water from the South PSMF will be released to the environment.

Water flow through the South PSMF will be as follows. Excess water from the low-sulphur storage area will drain to the southeast through a primary sedimentation pond to a process water pond. The process water pond will serve the needs of the milling operation with any excess water flowing to the west to the high-sulphur storage area. Excess water from the high-sulphur process solids storage area will be directed via a spillway to the Stream 6 catchment, which flows into Lake Superior.

Option 3

The Option 3 process solids management strategy includes the following: segregation of low- and high-sulphur material at the mill site via flotation; placement of low-sulphur process solids in an on-land impoundment and placement of high-sulphur process solids below water in an engineered cell within the main impoundment. A multi-cell PSMF will accommodate all of the life-of-mine low-sulphur process solids (54.6 Mm³) and approximately one-half (3.0 Mm³) of the life-of-mine high-sulphur process solids and the remaining volume of high sulphur process solids (3.1 Mm³) will be stored sub-aqueously in one of the satellite pits. Greater than 90% of the process water will be recycled back to the mill initially via a process water collection pond in the south cell of the PSMF and in later years of mine operations through a temporary process water pond created to the east of the PSMF. Excess process water will be released into Stream 6 down stream of the PSMF.

During process solids placement and after closure, interactions between solids and contact water can affect water quality. The following conditions were therefore considered in this assessment:

- potential interaction between the low sulphur solids and water that either infiltrates the process solids or runs off the facility; and,
- potential interactions between high sulphur solids and the overlying water column in which the solids are submerged.

2.3 Open Pits

The main pit will result in the production of about 240 Mt of mine rock. Two satellite pits are also proposed to extract high grade ore distal to the main ore body. Satellite Pit 1 (Malachite Pit) will produce about 28 Mt of mine rock and the Satellite Pit 2 Complex (including 3 small pits) will produce 20 Mt of rock (Micon, 2010). The primary open pit will be approximately 2 km long, 600 m maximum width, and 340 m maximum depth with an estimated 91 Mt of total mineral reserves. During mine operation and open pit development, water will be pumped from the pits. As the open pit is developed, water sheds will contribute surface water and some groundwater to the open pit, which will have contact with the pit walls and rock on benches and on the working floor of the pits. The

effects of exposure of the open pit rock to water was considered for the operation and post-operation time periods.

Once mining operations have ceased, and the pit begins to flood, the amount of pit rock surface area exposed to the atmosphere, and thus subjected to oxidation, will also decrease and reduce the amount of reactive area. It is estimated that the pit will reach a final flooded level decades after mining operations have ceased. Some of the pit walls will remain exposed to the atmosphere above the natural final water level in the pit after filling with water. The area exposed after flooding was considered in the assessment of metal loadings and estimates of metal leaching originating from the pit walls after decommissioning. The pit water will continue to be monitored post decommissioning, and treated if necessary, in order to meet water quality criteria before allowing natural discharge to the surrounding environment.

2.4 Process Water

The milling of ore requires water to transfer the crushed ore and to extract the economic minerals. The water in the mill is referred to as process water. Although a high degree of recycling of process water will occur in the mill, there will be excess process water that will be discharged to the environment during the operation. The interactions between solids and process water can affect the water chemistry and these effects were considered in this assessment. The characteristics of the process water can be estimated from the decant water produced in metallurgical tests.

3.0 METHODS

The rock and process solids were first characterized in order to understand the chemical compositions of the materials that will be stored at the site. Characterization included the analysis of acid base accounting (ABA) parameters that provide information on the potential for sulphide-bearing materials to generate acid in the long term if exposed to the atmosphere in on-land repositories. The characterization of the solids is generally referred to as static testing in the context of potentially acid generating or metal leaching materials. Kinetic testing in humidity cells or columns with submerged process solids was then considered to evaluate the rates of release of COPCs or loading rates that can then be applied to calculations of concentrations of COPCs in waters that contact the mine materials before entering the environment.

The methods used to assess the potential loadings of the various COPCs from mine components, as well as the potential to generate acidic water conditions, in drainage and surface water sources during operation and post-operation, are outlined in the following sections. Various components of the geochemical characterization were completed in previous investigations and are reiterated for each mine component, as appropriate. The primary focus of this assessment is on the static and kinetic testing completed in this and previous studies to estimate potential metal loadings and acid generation.

3.1 Characterization of Materials

3.1.1 Mine Rock

Mine rock was characterized to understand the material properties of rock that will occupy stockpiles on site. Selected samples representing a range of rock characteristics were subjected to kinetic testing in humidity cells in order to quantify release or loading rates for COPCs. The following sections describe the methods that were applied to characterization and evaluation of potential loading rates from mine rock.

Analysis

More than 100 rock core samples were selected in 2007 in relative proportion to the abundance of each rock type that underwent whole rock and bulk metal analysis, and ABA analysis (Golder, 2008). An additional 257 rock core samples were collected in 2010 and where 200 were subjected to ABA and bulk metal analysis, and 57 were subjected to sulphur analysis only. The 2010 samples were selected specifically to represent mine rock outside of the ore zone but within the planned pit shell based on the net smelter return (NSR) cut-off value of \$10.50 in order to distinguish between ore and mine rock samples. The 2007 samples were selected without information on the pit most recent pit development plan and of 114 samples, 15 of them would be considered ore grade material based on their NSR values. Therefore the 15 ore samples from the 2007 samples were not included in the final evaluations and calculations for mine rock destined for stockpiles. Ten mine rock samples that were tested in the humidity cells were also characterized according to

their major, minor, and trace mineralogical components. The 10 samples received qualitative and quantitative XRD analysis, and optical microscopy evaluation of polished thin sections (Golder, 2008).

Eighteen samples of mine rock were subjected to net acid generating (NAG) tests, of which ten were the same material used in the mine rock humidity cells (Golder, 2008). The NAG tests were conducted by adding hydrogen peroxide to each sample to oxidize the sulphide minerals and allow the acid produced from the reaction to react with the neutralizing minerals in the sample. The pH was then measured once the oxidation reaction was complete. Additionally, the acidity of the sample was measured at pH values of 4.5 and 7.0 by titration to determine the amount of acidity produced under an acidic and neutral conditions.

Lastly, forty-one samples of mine rock material from the 2007 samples were selected from the range of rock types and subjected to a short-term leach tests (Golder, 2008). The short-term leach test used a “modified” Synthetic Precipitation Leaching Procedure (SPLP) method to simulate what potential constituents were readily soluble in fresh rock samples. This method used a standard dilute sulphuric/nitric acid solution with a pH of 4.2, which was added to each mine rock sample and left to react for 18 hours. The “modified” SPLP test was conducted as outlined by the U.S.EPA (1998), with a minor change of using a 3:1 liquid to solids ratio, instead of the traditional 20:1 liquid to solids ratio to reduce dilution and improve assessment of the COPCs.

Humidity Cells

Ten humidity cells were established to be representative of each rock type comprising mine rock from the open pits (Golder, 2008). Since the rock samples for the humidity cells were selected, the proportions of each rock type have been updated by Marathon PGM Corp. (2009) based on additional drill core samples and an improved understanding of the ore body and mineral deposits. The refined proportions of each rock type, as shown in **Table 3.1**, were used in the final calculations to determine the weighted loadings from the entire mine rock stockpile, where appropriate. A summary of the rock samples in each humidity cell is provided in **Table 3.2**.

Humidity cells tests are intended to simulate weathering and leaching conditions experienced by mine materials when exposed to air and water in on-land storage facilities. In these tests, a mass of rock that has been crushed to less than 2.5 cm particles is rinsed with a known quantity of water weekly. The rinse water is collected and analysed for dissolved constituents. When 1 kg of rock is rinsed by 1 L of water each week, the concentrations in the leachate can be used directly to evaluate a loading rate that is expressed in mg-COPC per kg-rock per week or mg/kg/wk.

Humidity cells ran for various lengths of time dependent on the geochemical characteristics and behavior of the cells as indicated by the various analyses conducted. Each week pH, acidity, alkalinity, conductivity, sulphate, calcium, and iron were measured. A full metal

analysis (ICP-MS) that included a large suite of metals was only completed on the leachate every five weeks, except at the initial start of the humidity cells, where a full metal analysis was conducted for the first three weeks (weeks 0 to 2). Humidity cell MAR07-92 was terminated at week 27. Humidity Cells MAR07-18, MAR07-99, MAR07-80, MAR07-98, and MAR07-49 were all terminated at week 70, and cells MAR07-16 and MAR07-33 were terminated at week 90. Humidity cells MAR07-16 and MAR07-96 were both terminated at week 148. Average metal loadings were calculated for the initial loading during week 0 to 20 and then during “steady state” (S.S.) conditions from after week 20 to termination, except for sample MAR07-92 where “steady state” was achieved after 10 weeks.

The metal loading rates were then examined according to rock type and compared to total sulphur and sulphide sulphur contents. If concentrations of metals in the humidity cell tests were reported as being below laboratory detection, the detection limit value was used in the loadings estimates in order to maintain a conservative estimate.

3.1.2 Process Solids

Analysis

Three types of process solids were evaluated; Bulk, high sulphur and low sulphur process solids. Samples were subjected to ABA and bulk metal analysis. The bulk process solids sample was produced in 2008 by Xstrata Processing Services (XPS). The Bulk process solids refers to the material that will be produced after extraction of the economic minerals but before sulphur separation. The low-S process solids were generated by G&T Metallurgical Services Ltd. (G&T) in Kamloops, B.C. during a bench scale test conducted on a sample of the bulk process solids from the XPS 2008 metallurgical test. The objective of the G&T test was to optimize the sulphur removal from the Bulk process solids. There were two samples of process solids provided by Marathon, which were composited and then separated into 2 kg quantities for use in the sulphur removal process. Four of the 2 kg samples were then analysed for sulphur and iron contents, and each was subjected to the four step sulphur recovery process implemented by G&T. The bulk process solids sample had a feed sulphur content of approximately 0.6% S, mostly in the form of pyrrhotite (G&T Metallurgical Services Ltd., 2009). The simple flotation method used was able to recover an average of 76% of the sulphur into a rougher concentrate, which consisted of about 6% of the initial feed mass. The average remaining 94% of the feed process solids material, referred to as the “Bulk Rougher Tails” by G&T, was the material representative of the low-S material used in this investigation. A copy of the G&T report is provided in **Appendix 2**.

High-S process solids samples were produced during the G&T bench tests. A second pilot metallurgical test was implemented by XPS in April 2010 and additional quantities of high-S material were produced. The high-S materials from both G&T and XPS were combined to make one high-S composite process solids sample for static and kinetic testing.

Humidity Cells

The options for management of the process solids includes on-land disposal of the low-S material. To assess the potential loadings from this material, four humidity cell tests were initiated in November 2009 and continue to be actively being sampled. Approximately 1 kg (equivalent dry weight) of low-S process solids was placed in the top portion of a HDPE funnel. A layer of Nitex screen between two sheets of filter paper was placed in the funnel to retain the process solids, but allow for filtering of the water. Each week, distilled water was poured over the process solids and allowed to gravity drain into dedicated collection flasks for sampling. The pH and conductivity are measured immediately after sample collection. After sampling, the funnels were lightly covered with cellophane to prevent excessive evaporation and left undisturbed until the next sampling session.

Underwater Tests

Column tests with submerged material were completed on the high sulphur process solids as well as the Bulk Process Solids that represent material prior to sulphur separation. Because the high sulphur fraction of the process solids is less than 10% of the total, only small quantities were produced during the sulphur separation tests and consequently less than 2 kg of high sulphur process solids were available for the submerged tests. The high sulphur materials was also split to provide duplicate tests so that each submerged test contained about 600 g of material. The Bulk Process Solids were produced in much larger quantities in the XPS 2009 metallurgical test. Therefore the submerged tests were also completed on the bulk solids with sample masses of about 12 kg, resulting in a larger scale test than what could be completed with the high sulphur process solids. The results from the submerged tests on the Bulk Process Solids were then used to complement and verify the results from the high sulphur process solids.

The submerged waste column tests were designed to simulate the management of the high-S material that will be produced during the mine operation and stored underwater in the appropriate PSMF. The underwater storage of the high-S material was simulated in two small column tests. Two portions, of approximately 600 g each, of the dry composite high-S process solids were slightly wetted with distilled water and transferred to a 2 L transparent acrylic container. The process solids slurry was then carefully covered by distilled water to minimize disturbance. A sampling port was then installed in the overlain water column for water sampling at a consistent location. A small aerator was also installed to keep the overlain water column well-mixed and aerated. Water samples were then taken on a weekly basis and analysed for dissolved metal content, pH, and conductivity. The high-S material from XPS was received by EcoMetrix in August 2010, and therefore the column tests could not be initiated until September 2010 and are on-going.

Submerged waste column tests on the bulk process solids included approximately 12 kg of wetted bulk process solids from the 2009 XPS tests that was added to a 15 cm diameter, transparent column. Sampling ports were placed within the process solids material at depths of 5 cm, 15cm, and 25 cm, as well as one about 20 cm above the top surface of the

process solids in the water column. Water samples were collected at the initiation of the test from all three ports in the process solids, as well as from the overlying water column. The samples taken from ports represent the initial pore water chemistry in the process solids. Samples of the water column were collected weekly for 24 weeks. At the conclusion of the testing, pore water samples were collected from the sample ports to represent final pore water concentrations. Samples were analysed for dissolved metal content, pH, and conductivity.

3.1.3 Process Water

Mill process water will report to the low sulphur process solids management facility and after settling of the process solids will be decanted to the Process Water Pond. There will be excess process water after recycling to the mill so that some water will require discharge. The discharge water will represent a combination of process water with some local runoff. The water will have had time for settling of solids to remove TSS. The quality of process water was assessed by considering water that had been produced during the SGS and XPS metallurgical test work in 2004 and 2008.

3.2 Calculation of Loading Rates

3.2.1 Mine Rock Loadings

The humidity cell tests provide loadings results for a range of rock types and characteristics. For example, the sulphide contents of the samples subjected to humidity cell testing ranged from less than the detection limit of 0.01% to almost 7% as S. The results of the tests represent loading rates for COPCs were then compared to key characteristics of the rock that produced the observed loadings. Comparisons were made by assessing correlation coefficients and relationships between COPC loading rates and the initial contents of key COPCs. The measured correlations were then used to estimate loading rates for rock materials with known characteristics. In this manner, individual tests were not required on specific rock materials in stockpiles or pit walls, floors and rubble. The loadings were calculated from relationships found for humidity cell test results for specific material characteristics.

3.2.2 Low Sulphur Process Solids Loadings

The Bulk Process Solids samples produced during the 2008 XPS metallurgical test work are considered to be representative of material that will be produced during the mining operation before sulphur removal. Those solids were the source of material tested by G&T Metallurgical to evaluate the feasibility and effectiveness of sulphur separation and removal from the Bulk Process solids. The low sulphur process solids from those tests were used as samples in humidity cell tests to measure the loading rates of COPCs if the material is stored on-land in contact with the atmosphere.

The loading rates were derived from the results of concentrations in the humidity cell leachate from the four cells containing low sulphur process solids. The rates were averaged for COPCs and only a temperature adjustment was required with the value described for the mine rock loadings. No grain size adjustment was made because the material produced during mining will be similar to that tested. The loadings were, however, applied to a selected depth of process solids, assuming that the leaching reactions are mostly controlled by the presence of oxygen in the pore spaces of the process solids.

Experience has shown that oxygen may penetrate to various depths in sulphide process solids, depending on the residual sulphide content. With 0.1 to 0.2% S, oxygen penetration is expected to be up to about 3 m below ground surface. Therefore, the loading rates were applied to a zone of process solids that was considered to be 5 m deep to allow for some uncertainty in the depth of the oxidation zone. The total loadings were therefore calculated by assuming that water leached a zone of process solids 5 m thick.

Similar to the results for the humidity cells with mine rock, the loading rates were interpreted by considering COPC concentrations that are controlled by geochemical reactions, including solubility controls. Final loading rates were then estimated for the most appropriate controls.

3.2.3 High Sulphur Process Solids Loadings

The two Process Solids options include permanent storage of high sulphur process solids underwater. Option 3 also includes the storage of high sulphur process solids below the water table under a layer of low sulphur process solids. The high sulphur material below the water table will be completely isolated from the atmosphere and are not expected to react or leach to any measurable degree. However, the high sulphur process solids covered by water in a pond or pit will have the opportunity to interact with small amounts of dissolved oxygen in the water at the solids-water interface and some release of COPCs is anticipated under those conditions.

The column tests with submerged solids were completed to simulate under water storage. The results from the column tests were analysed to estimate the rates of release of COPCs from the process solids, referred to as fluxes, to the overlying water column. The concentrations in the water column were used in mass balance calculations to quantify mass release rates. The mass balance included the masses of COPCs collected in samples used to analyse for concentrations in the overlying water. These release rates in units of mg/wk were then converted to flux values by dividing by the area of the solids-water interface in the test to get units of mg/m²/wk.

3.2.4 Loading Rates for Mine Rock Stockpiles

Although humidity cell testing can provide a good indicator of the behavior of the mine rock stockpile, it is well known that loading rates from small scale humidity cell tests with finely crushed materials are not appropriate to directly calculate loading rates in stockpiles for full

scale mine rock facilities. In general, the specific surface area of rock particles, temperature and freezing conditions should be considered for modifying the loading rates observed in humidity cell tests. Therefore, the humidity cell test results were adjusted to account for temperature and grain-size (or surface area).

A correction factor for the humidity cell test results is required because the testing was completed at room temperature (20 to 25°C) while temperatures under field conditions for the stockpile will be approximately equal to the average air temperature at the site, in this case, about 5°C. Oxidation of sulphide minerals such as pyrite, are temperature dependent, as described by the Arrhenius equation:

$$\ln\left(\frac{k_1}{k_2}\right) = \frac{E_a(T_1 - T_2)}{RT_1T_2}$$

where k_1 and k_2 are reaction rates at temperatures T_1 and T_2 in Kelvins, E_a is the activation energy of the reaction (J/mol), and R is the universal gas constant (8.314 J/mol/K). The values of E_a for pyrite oxidation reactions, that are likely responsible for releasing metals, have been shown to be about 80 kJ/mol (Nicholson *et al.*, 1988). Therefore, a temperature difference from laboratory temperature (20°C) to field temperatures (5°C) would result in a difference of a factor of about 6 in the reaction rate. Estimated metal loads from the stockpile therefore include a correction factor of 0.17 (or 1/6) correction applied to the results of the humidity cell testing.

The second correction factor applied to the loadings estimates accounts for the fine grain size of the rock samples used in the humidity cell tests. The fine-grained material should contribute essentially all of the leached constituents from the mine rock pile, based on a unit mass basis because of the large surface area in the fines. A grain size analysis was conducted on two of the mine rock samples used in the humidity cells, namely MAR07-15 and MAR07-96, in order to establish a representative factor designed to account for the difference in material size from lab testing and actual field conditions. Based on the grain size analysis results, as shown in **Table 3.3**, there was a significant proportion of fine-grained (i.e. silt and clay) material. Therefore, a factor of 0.01 was applied to the results of the humidity cell testing assuming that only 1% of the stockpile is comprised of the fine-grain size (or high surface area) material in the humidity cells.

The loading calculation was then completed as follows:

$$MLR_{SP} = MLR_{HC} \times M_r \times \rho \times GS_f \times T_f \times \text{Appropriate Unit Conversions}$$

where:

MLR_{SP}	=	the mass loading rate for the stockpile (kg/a)
MLR_{HC}	=	the mass loading rate for the humidity cell (mg/kg/wk)
M_r	=	the mass of rock in the stockpile (kg)
ρ	=	density (kg/m ³)
T_f	=	is the temperature factor
GS_f	=	grain size factor

Values for the mass loading rates from the humidity cells tests were based on the average rates of each cell under the previously described “steady-state” conditions rather than any initial flushing of soluble oxidation products that may have formed on the rock surface prior to the tests.

3.2.5 Pit Rock

During operation, quality of the pit water will be affected by precipitation contacting and interacting with the exposed open pit walls and rock on the floor of the pit as the pit is developed. Although there will be minor influences of groundwater discharging through cracks, joints, and faults in the parent rock, the influence of precipitation and surface water interactions with the exposed rock surfaces will control the overall water quality of the pit. It is assumed that the quality of the open pit water during operations will not meet water quality guidelines because of suspended solids, and as a result the water will require appropriate management before discharge to the environment.

Once the mining operation in the open pit ceases, the pit will begin to naturally fill with water and will submerge the previously exposed walls, benches, and residual bench rubble. The submergence of the pit materials will eliminate exposure to air and will prevent further oxidation of materials, and consequential release of metals to the overlying water. There are two distinct processes associated with the potential release of COPCs from the rock materials in the pit once submerged. These processes include the initial release of previously generated soluble constituents to porewater that occurs when the pit and rubble first come in contact with water during pit flooding, and the longer-term diffusion-controlled releases from the pore water in the submerged rock to the overlying pit lake that occur after the materials are fully immersed in water.

The rate of release of constituents from pore water to the overlying water will be largest soon after the rock is covered by water and the rate of release or the loading to the pit water will decrease over time as flooding continues. The water quality in the pit during flooding will be monitored, and water will not be released from the pit until water quality is acceptable. The water can be treated in-situ if required by pH adjustment as has been successfully applied at other operations.

Long-term diffusion flux of metals from the submerged rock will also occur during flow through that will be of importance in terms of water management requirements in future but after a few years after flooding is complete, the rate of release will be very small compared to those when the rock was initially inundated. Modelling of the release of constituents from the rock to the overlying water column will be completed to estimate concentrations after flow through begins in order to ensure that concentrations of COPCs do not exceed appropriate guideline values when water is released to the environment.

3.3 Determination of a Sulphide Cut-Off Value for Mine Rock in Stockpiles

The BC Guidelines for the assessment of mine waste materials suggests that rock with a sulphur content of less than 0.3% S will likely represent a low risk for acid generation and metal leaching (Price, 1997). However, this is a generalization that should be assessed for site specific conditions. The selection of a sulphur cut-off content provides a means of managing rock during operation of the mine. The sulphur content of the rock can be assayed during mining and material that has a sulphur content below the cut-off value can be stored safely in typical on-land stockpiles while materials with sulphur contents greater than the cut-off value can be segregated for special management focused on prevention of release of drainage with unacceptable quality.

A cut-off value for the Marathon rock was assessed in this investigation. The assessment was completed by evaluating the extensive sulphur and ABA data base as well as the results of the loadings estimates based on humidity cell data.

4.0 RESULTS AND DISCUSSION

The characteristics of mine materials are first summarized and the results from the humidity cells and column tests follow. Estimated loadings are then presented for mine rock in stockpiles, rock material in pits, low sulphur process solids in the PSMF and high sulphur process solids covered by water. The development of a sulphur cut off value is then presented.

4.1 Material Characterization

4.1.1 Mine Rock

There are five rock types encountered in the Marathon PGM deposit. The ore is mainly associated with the Two Duck lake Gabbro (TDL) and this unit will comprise about 13% of the mine rock as well. The predominant mine rock material will be Eastern Gabbro, comprising 70% of the total. Minor quantities of volcanics (10%), syenite (5%) and breccia (1%) will also be included in the mine rock removed from the pit. While rock types are sometimes important in understanding the geochemical behaviour of mine materials, the results of this investigation have demonstrated that sulphur content is the key characteristic that controls the important geochemical reactions in the Marathon PGM mine materials. Therefore, the results are presented in terms of the characteristics of representative mine rock and process solids rather than by individual rock type.

While there are assay results for thousands of samples related to exploration that contain metal concentrations and sulphur contents, there were two specific sampling campaigns focused on the collection of samples specifically representing mine rock that will be removed from the pits. A suite of 114 samples was collected from existing core in 2007, of which 99 samples represented mine rock for the proposed open pits at that time (Golder, 2008). In 2010, an additional 257 samples were collected from existing core to provide representative samples from the updated pit shells, outside of the ore zones, in order to characterize the mine rock materials. The results of analyses from both the 2007 and 2010 mine rock samples were evaluated and are presented here for comparison. The chemical characteristics were summarized by rock type for the 2007 samples (Golder, 2008) and these results are presented in **Appendix 1**. These results showed that there were no large differences between rock types. Therefore, the 2010 samples were considered to represent mine rock with no differentiation among rock types. The 2007 and 2010 data sets were also very similar and therefore the data were pooled for the overall characterization of mine rock from the Marathon PGM deposit.

The results of metals and ABA analyses for the 2007 and 2010 mine rock samples are summarized in **Table 4.1**. Complete data is provided in **Appendix 1**. This table also includes a list of screening concentrations for rock that represent values that are 10 times the average crustal abundance in the earth's crust. Comparison between the maximum measured concentrations and the screening values shows that only copper is greater than 10 times the average crustal concentrations. This may be anticipated in a region of copper

mineralization. The maximum concentrations of all other constituents were less than the screening values and the geomean values were generally well below the screening values.

The 2007 and 2010 samples were also analysed for ABA parameters. The second group of samples were sub-sampled in 2010 to represent mine rock from the updated proposed pit design. The results of both data sets are summarized in **Table 4.1**. Overall, the ABA data sets agree well with each other, suggesting that the mine rock characteristics are very consistent and that the data can be pooled to provide greater confidence in the results and conclusions from those data.

The key results of the ABA analyses include the sulphide content that represents the acid generating potential (AP) and the neutralization potential (NP). The data show that the sulphide content of the mine rock varies from less than the reported detection limit of 0.01% S to a maximum of about 1% S in the 2010 samples and about 7% S in the 2007 samples. The geometric mean (or geomean) values for chemical data are used to represent central tendency values throughout this report because chemical concentrations in water and rock tend to have log-normal distributions that are best represented by the geomean value. The geomean sulphide content is 0.03% with a similar geomean for the total sulphur content of 0.04%. The mean sulphide content represents a geomean AP value of 1 kg-CaCO₃/t. The measured NP values range from 8 to 80 kg-CaCO₃/t with a geomean value of 31 kg-CaCO₃/t.

The data indicate that the total sulphur content is composed almost completely of sulphide sulphur as shown by the 1:1 correlation in **Figure 4.1**. The results from the 2007 and 2010 samples were plotted separately for visual comparison. One sample containing 6.7% total S was omitted from the 2007 data to show the lower range of sulphur contents in more detail. Nonetheless, the data clearly show that the total sulphur content is a good indicator of sulphide sulphur in Marathon PGM deposit.

The ratio of NP/AP is important in understanding the potential for acid generation in sulphide materials. The NP/AP ratio provides a means of screening potentially acid generating materials. Price (1997) provides guidelines for the interpretation of NP/AP values. If the NP/AP value is less than 1, then it is likely that the material will generate acidic drainage in the long term if stored on-land and exposed to the atmosphere. If the NP/AP ratio is greater than 4, then it is probable that any acid that may be generated will be neutralized and drainage will remain neutral. Samples with NP/AP values between 2 and 4 have a low probability for generating acid. Samples that have NP/AP ratios between 1 and 2 are considered to be uncertain with respect to the potential for acid generation. The results from the 2010 ABA data set show that only one sample from the 2010 data set and 5 from the 2007 data set falls below the 1:1 line and only 4 of 356 samples have NP/AP ratios between 1 and 2 (**Figure 4.2**). All other samples have NP/AP ratios greater than 2 and the vast majority have values greater than 4.

When considering the NP characteristics in sulphide rock, it is also useful to understand the role of carbonate minerals. While the ABA analysis does not quantify carbonate minerals

directly, the analysis does include the measurement of carbon dioxide that is an indication of carbonate solids in the sample. The carbonate content can then be used to estimate a carbonate NP (Carb NP) that can be compared to the Sobek NP values. The results for the 2010 ABA data set shows a relatively poor correlation between Carb NP and Sobek NP as presented in **Figure 4.2**. Although the correlation is not good, overall Carb NP represents on average about 35% of the total NP and remains an important component of the overall NP with values as high as 50 kg-CaCO₃/t (**Figure 4.2**). The mineralogical assessment of the mine rock also confirms the presence of small amounts of carbonate minerals, primarily as calcite (Golder, 2008) as discussed previously in this report. These results suggest that carbonate minerals are not consistently available in the rock but carbonate neutralization potential can be important in the rock.

4.1.2 Process Solids

The process solids that will be produced after extraction of the economic minerals will contain residual sulphide minerals. The ABA results for this “Bulk Process Solids” are summarized in **Table 4.2**. The Bulk Process Solids contain about 0.5% total sulphur and sulphide sulphur. The NP/AP ratio of the Bulk solids is about 2. These characteristics suggest that there is a low but potential risk of acid generation in the Bulk Process Solids if stored on-land in contact with the atmosphere.

Sulphur removal and special management of the high sulphur material was selected as the operational strategy to reduce the potential for acid generation in the majority of the process solids. A pilot test was completed on the Bulk Process Solids in order to demonstrate that sulphur removal was technically feasible through a separation process that creates two streams of process solids. The stream with representing more than 90% of the tailings mass has the sulphide minerals removed by flotation processes. The second stream contains the sulphide minerals that will be floated off of the bulk tailings and represents less than 10% of the total tailings mass. The results of the test program showed that sulphide sulphur could be effectively removed from the Bulk Process Solids, removing only about 6% of the solids and leaving 94% of the process solids with a very low sulphur content (G&T Metallurgical, 2009) see **Appendix 2**.

The ABA results for the high and low sulphur process solids are summarized in **Table 4.2**. The high sulphur solids contained about 7% total sulphur and 6% sulphide sulphur. Although the NP of the high sulphur solids was 45 kg-CaCO₃/t, the NP/AP ratio was less than 1, as anticipated. The high sulphur material, representing less than 10% of the total Bulk Process Solids, will be produced in the mill via the sulphur separation process. This produced material will be stored underwater either at the bottom of a pond, pit or below the water table in the process solids management facility, or both to prevent acid generation and metal leaching.

Four samples of low sulphur process solids were produced in the sulphur removal tests. The individual results for the four low sulphur samples are shown in **Table 4.2**. The total sulphur content of these samples ranged between 0.12 and 0.21% S with sulphide sulphur

values in the range of 0.06 to 0.12% S. In addition to the low sulphur contents, all solids exhibited NP/AP ratios of greater than 5, ranging from 5.6 to 11.2. Material with these characteristics represents non-acid generating solids that can be stored in on-land facilities without risk of acidification.

In addition to acid generation, the potential for metal leaching was also considered for process solids. The metal contents of the high-and low-sulphur process solids are summarized in **Table 4.2**. In general, the concentrations of most COPCs are higher in the high sulphur process solids than those measured in the low sulphur solids. These results suggest that metals and other COPCs are associated with the sulphide minerals and that when sulphur is removed from the Bulk Process Solids, so are many other COPCs. The underwater storage of the high sulphur solids will also mitigate metal leaching so that the concentration of COPCs in the high sulphur process solids is a positive by-product effect of sulphur removal.

4.2 Kinetic Test Results

Kinetic tests focused on the simulation of on-land storage of mine rock and low sulphur process solids with humidity cells and underwater storage of high sulphur process solids with column tests containing submerged material. The kinetic tests were evaluated to estimate loading rates for COPCs that can then be used to calculate contributions to concentrations in water when flow rates have been estimated.

4.2.1 Humidity Cells

4.2.1.1 Mine Rock

The humidity cell results were plotted as measured concentrations of COPCs with time by rock type for each humidity cell as shown in **Figures 4.3 to 4.7**. Complete results are provided in **Appendix 3**.

The plots for sulphate concentrations typically exhibited elevated concentrations at early times followed by lower concentrations at later times. The higher initial concentrations represent an initial flushing of the crushed rock samples and the lower values at later time represent a more constant rate of release that may be related to oxidation or other weathering reactions that occur in nature. In many of the cells, concentrations did not exhibit steady-state concentrations in later times but rather, exhibited increasing concentrations with time, for example with cobalt in cell MAR07-15 in **Figure 4.4a**. The cells exhibiting increases in loadings at later times were generally those with very high sulphide contents, more representative of ore-grade material. The significance of these trends will be discussed in further detail below.

The results from the earlier and later time periods were analysed separately to assess the long term loadings that may be expected in drainage from the mine rock stockpiles. The loading rates for the humidity cells is readily evaluated because the 1 kg of rock in each cell

was rinsed with 1 L of water each week so that the concentration of a COPC in the leachate expressed in mg/L is equivalent to a loading rate in mg/kg/wk.

The key observations related to the humidity cell tests on mine rock are as follows;

- The pH values of the leachate, with one exception, remained near neutral for the duration of tests that ran up to 150 weeks;
- The one cell that exhibited pH depression to values near 5 after about 140 weeks had rock with the highest sulphur content of 6.7% S. This material was representative of ore and not mine rock;
- The concentrations of sulphate in leachate were typically high initially and decreased to lower values at later times;
- The concentrations of sulphate resulted in higher values for samples with higher sulphur contents;
- The concentrations of many COPCs in leachate from most cells exhibited low relatively constant values, many of which were reported as less than the analytical detection limits; and,
- Concentrations of COPCs such as cobalt, copper and nickel exhibited rising concentrations over time for cells that contained high sulphur rock, typically greater than 3% S.

The humidity cell tests were initiated on materials that represented all rock types and a wide range of sulphur contents. A summary of characteristics of the rock in each cell are reported by Golder (2008). The materials selected for testing in the cells were not intended to be representative of the sulphide content of mine rock in the stockpiles. The materials that were tested in the humidity cells have sulphur contents that range from 0.011 to 6.7% S whereas the geomean content of mine rock will be close to 0.04% S. The humidity cell test results, however, provide a basis on which to assess a variety of mine materials including low grade ore and rock in the open pits that require some consideration of potential loading rates to estimate water quality. The humidity cell results also provide important information on relationships that can be used to estimate loading rates for materials that may otherwise exhibit results dominated by values that were less than analytical detection limits and therefore result in indeterminate loading rates. The assessment of loading rates for the humidity cell results is presented in a later section of this report.

4.2.1.2 Low Sulphur Process Solids

Four humidity cells were initiated on the individual low sulphur samples, and results are summarized as plots of selected COPCs over time in **Figure 4.8**. Complete results are listed in **Appendix 3**.

The key observations related to the humidity cell tests on low sulphur process solids are as follows;

- the pH of leachate remained near neutral for all samples with the exception of some samples that exhibited values between 5 and 6 that were attributed to a laboratory artifact as explained below. The laboratory artifact was corrected after week 30 and the pH values since then have been consistently above 6.5;
- sulphate concentrations in leachate from all cells were initially high and subsequently decreased after about week 4 to values that approached steady state with concentrations between 8 and 20 mg/L at later times; and,
- the concentrations of other COPCs generally exhibited higher concentrations initially that decreased to low and steady values after about week 4.

The pH values measured in the laboratory were discovered in 2010 to be operator dependent approximately between weeks 10 and 30. The low pH values were traced to the use of glassware by one operator that had been acid washed to remove dissolved metals but had not been thoroughly rinsed to remove very small traces of the acid. The residual acid was sufficient to lower pH values to about 5. After recognizing this pH bias, procedures were altered and pH values become more consistent between operators as shown by the pH measurements after week 30 (**Figure 4.8**).

4.2.2 Column Tests – Submerged Process Solids

4.2.2.1 High Sulphur Process Solids

The results for the column tests on the high sulphur process solids are summarized as plots of COPC concentrations in the overlying water with time in **Figure 4.9**. Complete results are listed in **Appendix 3**. The results for the high sulphur process solids are considered to be very preliminary because only 5 weeks of data were available at the time that this report was prepared.

The key observations from results of the submerged high sulphur process solids are as follows;

- The pH of the overlying water was neutral and values remained between 7 and 8,
- sulphate concentrations increased during the test period from about 100 mg/L to a maximum of about 800 mg/L,
- concentrations of many COPCs, including arsenic, cadmium, iron, lead, selenium and zinc were near or below detection limits after the start of the test, and;
- concentrations of some COPCs, including cobalt, copper, molybdenum, nickel and uranium exhibited increasing concentrations during the test period.

The results, overall, are dominated by the early-time response expected for process solids that have been newly placed underwater after being stored in air. The sulphate concentrations clearly show that sulphate had accumulated on the solids and is being washed off the solids and was entering the water column over the first 5 weeks of the test. The increase in sulphate concentrations over 5 weeks reflects the release of higher sulphate concentrations from pore water in the flooded process solids. This is consistent with oxidation of the sulphide minerals during dry storage in air prior to testing and the accumulation of soluble sulphate prior to flooding of the sample. This behaviour could also explain the increases in other COPCs after flooding.

The large increases in sulphate and some metals were not observed for the submerged Bulk Process Solids as discussed below.

The Bulk Process Solids were stored in drums under water and were therefore protected from significant oxidation before testing in the columns. Therefore soluble products did not accumulate on the Bulk Process Solids and high concentrations were not observed in the overlying water in the column tests.

4.2.2.2 Bulk Process Solids

The results for the column tests on the submerged Bulk Process Solids are summarized as plots of COPC concentrations with time in **Figure 4.10**. The complete chemical results are listed in **Appendix 3**.

The key observations from the results of the submerged Bulk Process Solids are as follows;

- the pH of the overlying waters in the columns remained neutral with values typically in the range of 6 to 7.5 over the 24 week test;
- sulphate concentrations in the overlying water started at values less than 20 mg/L and increased slightly in one column to about 25 mg/L and in the other column to about 45 mg/L after 24 weeks;
- the concentrations of some COPCs such as molybdenum in the overlying water exhibited increases over the first 10 weeks that became relatively constant or near steady state between 10 and 24 weeks;
- the concentrations of aluminum that increased initially, declined to near constant concentrations of about 0.03 mg/L between 10 and 24 weeks;,
- the concentrations of many COPCs including arsenic, cobalt, copper, lead, nickel, uranium and zinc were near or below reported detection limits in the overlying water for the duration of the test; and,
- concentrations of molybdenum and zinc were detectable but low over the test period.

These results reflect the geochemical stability of the Bulk Process Solids when submerged in water. The results were assessed to estimate the loadings of COPCs from the submerged solids into the overlying water and the results are presented in a later section of this report.

4.3 Loadings Estimates

The kinetic test results from mine rock and process solids in humidity cells and process solids in submerged high sulphur column tests form the basis for estimating the loading rates of COPCs from the mine materials to the contact water, whether as drainage from stockpiles or as overlying water for submerged process solids. This section presents the results of the loadings estimates.

4.3.1 Loadings from Mine Rock

The results from the humidity cells containing mine rock were evaluated to determine loadings of COPCs from material anticipated to be in mine rock stockpiles, in pit walls and rock material on floors and benches of pits. No one humidity cell contained material that would represent the average characteristics of the mine rock in stockpiles or on the pit walls. However, the humidity cell results were analysed to provide relationships that allow estimates of loadings from materials over a wide range of sulphide contents and concentrations of COPCs in the rock so that loadings could be estimated for materials representative of those materials in stockpiles and in pits.

While all rock types were subjected to humidity cell testing in order to determine whether results were rock-type specific, the results clearly showed that loading rates were either controlled by the sulphur or COPC content of the rock or by geochemical equilibrium. The rock type did not play an important role in controlling the release rates of COPCs. A plot of the steady-state sulphate loading rates after 20 weeks against sulphide contents in the humidity cell rock samples shows the strong correlation between those variables (**Figure 4.11**). The upper plot shows all results by rock type. While a linear correlation would also have a high R^2 value, the non-linear correlation shown in the plot presents a somewhat better fit for the data. Because the mine rock of interest for assessment will have a sulphur content that is much lower than 1% S, the correlations were further assessed by excluding results for cells with rock containing greater than 1% S. The lower plot in **Figure 4.11** indicates a strong power function correlation between sulphate loading rate and sulphide content ($R^2 = 0.99$).

The correlations between sulphate loading rates and total sulphur content were also examined for comparison. The correlation plots are shown in **Figure 4.12**. The correlations with sulphide and total sulphur contents are similar with a small difference that the relationships with total sulphur are better represented with linear correlations. Nonetheless, the data show that overall, total sulphur is an excellent representation of sulphide and the relationships between sulphate load and sulphide content are stronger

than those with total sulphur. Therefore, the correlation between sulphate load and sulphide content for values less than 1% S was used to estimate sulphate loading rates.

The relationships between sulphate loading rate and sulphur contents are expected because sulphate is a product of sulphide mineral oxidation and the reaction rates are dependent on the sulphur concentration in the solids among other variables. With this relationship, the loading rate of sulphate can be estimated for a specified sulphur content in the rock that is representative of material in the mine rock stockpiles. Because many COPCs are associated with sulphur in the rock, similar relationships can be determined between the loading rates for individual COPCs and the sulphur content of the rock. However, not all COPCs are related to the sulphur content and therefore there can be other relationships or controls on loading rates for those COPCs. The relationships and controls on loading rates for individual COPCs were investigated systematically. The results of that investigation are summarized below.

The loading rates for individual COPCs were compared to sulphur contents as well as to the initial concentrations of COPCs in the mine rock. The plots of those relationships are presented in **Figures 4.13 to 4.25**.

As shown in **Figures 4.13**, there is no obvious relationship between the aluminum loading rate and the sulphide content or the bulk aluminum content of the solid material. The aluminum concentration in the leachate samples appear relatively constant for the most part, with the exception of one Eastern gabbro cell (MAR07-18), which had a loading rate almost one order of magnitude greater than the other nine humidity cells. The higher loading rate associated with MAR07-96 and rise in aluminum concentration is related to the decrease in pH near the end of the test. The geochemistry of aluminum is well known and the concentrations in the humidity cell leachate are likely to be pH controlled. In this case, it is therefore appropriate to assume a constant concentration for aluminum that is represented by the geomean value for cells that exhibited neutral pH values that are anticipated in mine rock in stockpiles. The value from MAR07-96 was not included in the calculation of the geomean.

As shown in **Figures 4.14**, there is no obvious relationship between the arsenic loading rate and the sulphide content of the solid material. The logarithmic best fit line may suggest a correlation between the bulk arsenic content and the arsenic loading rate, but because of the low R^2 value and heavy influence of one outlying Eastern Gabbro sample (26 mg/kg, 0.0033 mg/kg/wk) confidence in such a relationship is low. The arsenic loading rate therefore appears to be either constant, random, or a function of some other geochemical property. The representative loading rate was therefore assumed to be the weighted geomean value for the humidity cells excluding the ore samples MAR07-15 and MAR07-16.

As shown in **Figure 4.15**, there is a potential correlation between the sulphide contents of the material and the cadmium loading rates. This direct relationship between sulphide content and cadmium loading may either be linear or exponential, as there is evidence of both relationships with similar R^2 values. There is no obvious relationship between the bulk

cadmium content of the rock material and the cadmium loading rate. The loading rate for cadmium was therefore estimated from the linear relationship between the loading rate and sulphide content with the estimated sulphur content of the mine rock stockpiles.

As shown in **Figure 4.16**, there is a correlation between sulphide content and cobalt loading, as suggested by the power function best fit line. In **Figure 4.16b**, sample MAR07-96 (6.3 %S) is excluded to assess the correlation for samples with lower sulphide values. The exponential correlation is weaker with the highest sulphur value removed. If samples with sulphide contents greater than 1% S are excluded from the analysis, there is no correlation. **Figure 4.16c** suggests that there is not a strong correlation between bulk cobalt content and cobalt loading, as indicated by the poor regression line and R^2 value. However, when sample MAR07-96 with the highest sulphide content was excluded in the trend analysis there does appear to be a good power function correlation between the bulk cobalt content and the cobalt loading. This may suggest that for samples with a lower sulphide content the loading rate will be directly related to the sample cobalt content, yet the content of sulphide will still play a role in cobalt leaching at high sulphur content values. Therefore, the cobalt loading rate was estimated from the power function correlation with the initial cobalt content of the mine rock that will be placed in the stockpiles. The initial cobalt content is represented by the geomean value estimated for mine rock stockpiles.

As shown in **Figure 4.17**, there appears to be a power function correlation between sulphide contents and copper loadings. There is no obvious correlation between copper loading and the bulk copper content, as depicted in **Figure 4.17b**. If samples with sulphur contents greater than 2% are excluded from the analysis, the correlation coefficient increases with $R^2 = 0.92$. Therefore, copper loadings were estimated from this correlation and the expected sulphur content.

The results for iron are presented in **Figure 4.18**. As shown in the plots, the loading of iron is not directly correlated either to the sulphide content or the bulk iron content of the solid material. The iron loading rate appears to be relatively constant for the various rock types. The higher iron concentrations in sample MAR07-96 are likely the result of the high sulphide content of that sample, as well as the depressed pH values at later times.

Iron concentrations are known to be pH controlled in oxidizing environments in which iron is in the ferric form (Fe^{3+}). The solubility of ferric hydroxide is known to control iron concentrations at neutral pH. The majority of measured iron concentrations were reported as less than the reported detection limit. The iron concentrations were therefore estimated from iron solubility at a pH of 7.

The results for lead (**Figure 4.19**) suggest no clear and reliable relationship between sulphide contents and the lead loading rates, as indicated by the poor correlation. Although not entirely clear, there may be a relationship between the bulk lead content and the lead loading rate as suggested in **Figure 4.19b**. The data suggest that bulk lead content is a better proxy for estimating lead loadings, even though the R^2 value in **Figure 4.19b** is

relatively low. The lead content correlation was used to estimate the loadings for representative mine rock.

As shown in **Figure 4.20**, there appears to be a power function correlation that inversely relates sulphide content and molybdenum loading. However, the reliability of the correlation is heavily influenced by the one syenite sample, which exhibits a low sulphide content, with the highest molybdenum loading rate. Excluding the potentially anomalous syenite sample would suggest that molybdenum is not correlated with sulphide content, but rather relatively constant with varying sulphide content.

Similarly, it appears that there is a correlation that relates the bulk molybdenum content and the molybdenum loading rates, as illustrated in **Figure 4.20b**. However, this correlation is again heavily influenced by the potentially anomalous syenite sample, which has the highest molybdenum content and loading rate. The other nine humidity cells all exhibit relatively similar molybdenum loading rates independent of their respective molybdenum contents. The molybdenum loading rate was therefore estimated from the weighted geomean excluding the ore sample cells MAR07-15 and MAR07-16.

As shown in **Figure 4.21**, there appears to be an exponential relationship that directly correlates sulphide contents and nickel loadings. **Figure 4.21b** shows the same data as plotted in **Figure 4.21a**, excluding the loading rate for sample MAR07-96, to show in more detail the relationship between the lower sulphide content samples and their respective loading rates.

Figure 4.21c shows that there is no obvious relationship between the bulk nickel content of a sample and its nickel loading rate when all samples are considered. However, upon exclusion of the higher sulphide sample, MAR07-96, the data suggest that there may be an exponential relationship that correlates the bulk nickel contents with the nickel loading rates. These two proposed correlations may suggest that the rate of nickel loading is dependent on both the sulphide content and bulk nickel content, and either may serve useful as a proxy in determining the loading rate of nickel from the mine rock pile. Because the nickel concentrations represent a larger range in values with a similar R^2 value to the correlation with sulphide, the initial nickel content was used to estimate the nickel loading rate for mine rock.

As shown in **Figure 4.22**, there are no clear correlations between either sulphide contents or bulk selenium contents and the loading rates for selenium. The lack of any relation that potentially could have existed in either case is to be expected given the high number of samples that were below detection when analysed for selenium. Thus, the loading rate of selenium is relatively constant. In this case, the loading rates for selenium will be biased high as a result of values below the detection limit, and the results should be interpreted carefully with this bias considered. The selenium loading was estimated as the geomean of measured values based on values of one-half of the detection limit when values were reported as below detection.

As shown in **Figure 4.23a**, there appears to be no obvious correlations that relate the sulphide contents with the loading rates of uranium, even though the plotted data vaguely suggest an inverse relationship. **Figure 4.23b** also suggests that there is no clear relationship between the bulk uranium contents and the uranium loading rates. However, it is evident that the syenite sample, which has a uranium content that is one order of magnitude greater than most of the other samples, does produce the largest load of leached uranium. The uranium loading rate was therefore estimated as the weighted geomean for all cells excluding the ore samples in MAR07-15 and MAR07-16.

As shown in **Figure 4.24**, there appears to be some correlation that inversely relates the loading rate of vanadium to the sulphide content of the material. Even though the moderate R^2 value suggests a low reliability in the correlation, it is apparent in **Figure 4.24a** that as the sulphide content increases the loading of vanadium seems to decrease for the different materials in the ten humidity cells tested. If the three highest sulphide samples are excluded, there is no correlation between loading rates and sulphide contents. There is no clear correlation that relates the bulk vanadium content with the vanadium loading rate, as shown in **Figure 4.24b**. The vanadium loading rate was therefore estimated from the weighted geomean of values for samples with less than 2% S.

As shown in **Figure 4.25**, there appears to be an exponential correlation that directly relates the sulphide content with the loading rate of zinc. There is no clear relationship between the bulk zinc content and the zinc loading rate, as shown by **Figure 4.25b**. If the data are considered for samples with a sulphur content less than 2% S, a strong exponential correlation exists. The zinc loading rate was therefore estimated from the correlation with sulphide content for sulphur values less than 2%. A summary of the laboratory loading rates for COPCs is presented in **Table 4.3** together with notes on the methods used to estimate the final values.

4.3.2 Loading Rates for Low Sulphur Process Solids

The laboratory loading rates for COPCs from the low sulphur process solids were estimated from the steady state portions of the concentration versus time plots shown in **Figure 4.8**. The steady state loading rates were represented by the data from week 4 to the end of the test. The results for most of the COPCs are represented by concentrations in the leachate that are below analytical detection limits and therefore the estimated loading rates will represent conservative maximum values and will require careful interpretation when the effects of seepage on the local watershed drainage are considered.

As discussed in the methods, the zone of process solids representing the reactive or oxidized zone comprises the top 5m of the process solids. With a dry bulk density of 1500 kg/m³ in the process solids, the laboratory based loading rates can be converted to a rate per volume to apply to the low sulphur process solids in the PSMF. The results of the volume based rates are summarized in **Table 4.4**.

4.3.3 Loading Rates for Submerged Process Solids

High Sulphur Process Solids

The loading rates and fluxes of COPCs from the submerged high sulphur process solids are considered to be very preliminary because only 5 weeks of data were available for the analysis at the time this report was prepared. The loadings were estimated from the results of the tests with submerged high process solids as shown in **Figure 4.9**. The results for most COPCs in that test were reported as at or below analytical detection limits and therefore the estimated loading rates will conservatively represent maximum values.

The loading rates were estimated from mass balance calculation for the overlying water including mass associated with samples collected for chemical analysis. The mass release from the high sulphide process solids was calculated weekly to provide estimates of loading rates in mg/wk and then divided by the surface area of the solids to provide flux values in units of mg/m²/wk. The results are summarized in **Table 4.5**. Some of these loadings rates will be subject to adjustments including those for aluminum and iron that will be controlled by solubility constraints at the pH value of the overlying water. Constant concentrations of aluminum and iron are anticipated and will therefore override releases from the solids represented by loading rates.

The flux values for COPCs to the overlying water from the high sulphur process solids are plotted with time in **Figure 4.26**. The flux values for several COPCs decreased with time over the 5 weeks of the on-going test. These decreases in rates was anticipated as soluble COPCs were flushed from the process solids after flooding. These rates are expected to stabilize over time and this will be verified by reviewing results as they become available.

Bulk Process Solids

The loading rates and fluxes of COPCs are based on the steady-state conditions in the test columns that represented weeks 4 to 24. The concentrations of many COPCs in the water were reported as below analytical detection limits so that the estimated loading rates and fluxes will represent conservative maximum values. The loading rates (mg/wk) were estimated from mass balance calculations that included mass associated with samples collected for analysis to quantify weekly release rates. The loading rates were then converted to flux values (mg/m²/wk) by dividing by the surface area of the submerged process solids. The results are summarized in **Table 4.6**. The loading rates for some COPCs will be adjusted as a result of geochemical controls such as solubility. Aluminum and iron will be controlled by solubility rather than loading rates in an underwater facility.

The flux values for COPCs to the overlying water from the Bulk Process Solids are plotted with time in **Figure 4.27**. Most COPCs exhibit constant flux values that are an artifact of concentrations at or below analytical detection limits. Aluminum showed a near constant flux that approached zero, consistent with a solubility control. One COPC, molybdenum, exhibited a decrease in flux over time that had not yet stabilized over 24 weeks.

Although sulphate flux values exhibit oscillation as a result of the crude calculation method, there is a slight downward trend with time. The flux values are expected to stabilize over time. Modelling will be required to develop better long-term estimates of COPC fluxes.

4.3.4 Loading Rates for Mine Walls

The loading rates of COPCs estimated from humidity cell results are expressed in terms of mass of rock tested with units of mg/kg/wk. These rates can also be expressed in terms of surface area of the rock. The surface area based rates are required to estimate loadings for pit walls for which the exposed surface areas can be estimated. The rates are converted by using specific areas or area per unit mass for the humidity cell sample to calculate the total exposed area of particles in the rock sample. The specific surface area is a function of grain size that can be expressed as (Nicholson, 1994);

$$A_s = 6 / \rho d$$

in which A_s is the specific area (m^2/kg), ρ is the particle density (kg/m^3) and d is the grain diameter (m). The grain size analysis of the humidity cell samples provide estimates for the distribution of grain diameters that are summarized in **Table 3.3**. This table also includes the specific area values for all grain sizes and the total area for each humidity cell sample. The loading rates were then recalculated on a surface area basis and the values are summarized in **Table 4.3**.

4.3.5 Loading Rates Adjusted to Mine Site Conditions

The laboratory loading rates developed in this investigation require adjustments, in some cases, to be consistent with the properties of materials and with temperatures expected at the mine compared with those in the laboratory. For reasons noted, adjustment factors are described in the methods section, were applied to laboratory rates where applicable. A summary of laboratory values and corresponding mine site loading rates and fluxes is presented in **Table 4.7**.

4.4 Sulphur Cut-off Value for Mine Rock in Stockpiles

Price (1997) suggested that rock with a sulphur content of less than 0.3% S represents low to no risk of acid generation. This value was considered in more detail for site specific rock for the Marathon PGM project. First, the NP/AP values for rock were evaluated as a function of sulphur content in order to understand the potential for acid generation in material with less than 0.3% S. Then the average characteristics of the material with less than 0.3% S were assessed.

The NP/AP values were plotted against the sulphur content of the mine rock samples and the results are shown in **Figure 4.28a**. This plot shows that the NP/AP ratios increase as sulphur contents decrease. The vast majority of samples have NP/AP ratios greater than 4

and sulphur contents of less than 1% S. The same data were plotted with maximum values of NP/AP of 20 and sulphur of 2% to visually assess the relationship of NP/AP values to sulphur content near the suggested cut-off value of 0.3% S (**Figure 4.28b**). The data show that there are very few samples with NP/AP values less than 4 and sulphur contents greater than 0.3%. In addition, there are fewer samples with sulphur contents less than 0.3% S that have NP/AP values less than 4. This means that only 8 of the 356 samples below the suggested cut-off value for sulphur of 0.3% represent uncertainty with respect to potential for acid generation.

If only rock with 0.3% S or less is placed in the stockpiles, then 2% of the material falls into the uncertain category for the potential for acid generation and the remaining rock with less than 0.3% S has NP/AP ratios greater than 4 with no potential for generating acid. The characteristics of mine rock with sulphur contents of less than 0.3% S are summarized in **Table 4.8**, with characteristics of mine rock with sulphur contents greater than 0.3% S provided in **Table 4.9**. The data for the 2007 and 2010 ABA samples are shown for comparison and the pooled data are listed to show the overall results. The data show that the average, geomean, maximum and minimum values for material with less than or equal to 0.3% S are very similar for the two data sets. The geomean sulphur contents for the 2007 and 2010 samples are 0.04 and 0.03% S respectively, with a pooled value of 0.04%, a value that is almost ten times lower than the proposed sulphur cut-off value of 0.3% (**Table 4.8**). The maximum and minimum values for total sulphur are also similar and have pooled values of 0.3 and less than 0.01% S, respectively. These data verify that mine rock with sulphur contents that are less than 0.3% S has an overall representative sulphur content that is ten times lower than the cut-off value. This material has a geomean NP/AP value of 32 kg-CaCO₃/t. As well, the loading rates will be representative of material with the sulphur content of 0.04% are low to insubstantial for COPCs.

The material that has a sulphur content greater than 0.3% S has a geomean sulphur value of 0.6% S with maximum and minimum values of 6.7 and 0.31% S as shown in **Table 4.9**. This material represents only 6% of the total (21 of 356) samples and is considered to be a reasonable representation of the percentage of mine rock that will fall above the cut-off value of 0.3% during pit development. This material will be identified during pit development by assaying the blast-hole cuttings in a manner similar to that performed for ore grade control and after the material is identified, it will be scheduled for special management while material with sulphur contents less than or equal to 0.3% S will be directed to the permanent mine rock stockpiles.

Overall, the characteristics of mine rock with less than or equal to 0.3% S will have a very low sulphur content that should not represent a risk to the environment. The average NP/AP ratio for this rock will be 32 kg-CaCO₃/t that is adequate to neutralize any small amount of acid that may be released from the small quantities of residual sulphide in the mine rock.

4.4.1 Management of Mine Rock with Sulphur Contents Above 0.3% S

The sulphur distribution in the Marathon Project ore has been intensively studied and is well characterized. The distribution of sulphide sulphur is not random but, rather, follows a recognizable pattern that will be positive for management of high sulphur mine rock. Sulphur in the Marathon deposit is generally distributed between two dominant minerals; chalcopyrite (CuFeS_2), the primary ore mineral for copper and pyrrhotite (Fe_{1-x}S), a non-economic iron sulphide mineral. The total sulphur content is predominately composed of a combination of chalcopyrite plus pyrrhotite. The distribution of these minerals as a percentage of the total sulphur, however, changes systematically with depth below ground surface. This is shown graphically in **Figure 4.29** that shows the proportion of chalcopyrite representing the total sulphide content of the rock as a function of depth from ground surface. The total sulphur content of the rock is shown as a function of depth on the same scale for comparison. Together, these plots illustrate that chalcopyrite represents up to 100% of the sulphide sulphur at depths of about 50 m below ground surface while it represents less than 10% of the total sulphide sulphur at depths greater than 120 m. This means that at shallow depths, almost all sulphur occurs as the copper ore mineral with the expectation that this material represents ore that will report to the mill for the extraction of the sulphur for economic value. However, as depth increases, the proportion of sulphur that occurs as chalcopyrite decreases and that in pyrrhotite increases. Therefore, in general, there is less ore mineral content and more waste sulphide, as pyrrhotite, encountered with increasing depth. This trend also infers that higher sulphur contents in mine rock will be encountered at depth, later in the life of mine. This has important implications for managing mine rock with sulphur contents above the cut-off value of 0.3% S.

While the amount of mine rock that exceeds the cut-off sulphur value is estimated to be about 6% of the total or about 17 Mt, the majority of the high sulphur mine rock will be encountered in later stages near the bottom of the main pit. This means that the satellite pits can be mined out prior to encountering the high sulphur mine rock in the main pit and will be available for back filling with high sulphur rock for permanent storage underwater after the satellite pits have flooded at the end of operations. In this manner, the majority of the high sulphur mine rock will be placed immediately in pits that will flood while a lesser quantity of high sulphur rock can be managed either on surface with drainage controls or within the high sulphur process solids pond if sufficient volume is available. If high sulphur mine rock is placed in managed impoundments during operations, prior to the availability of storage volumes in satellite pits, the rock can be relocated to the satellite pits before the end of the operation for safe storage in the pits that will flood and cover all potentially reactive mine rock. At the end of the mine operation, all mine rock with high sulphur contents will be stored in either the satellite or main pits and will be covered by water and isolated from the atmosphere to prevent oxidation and associated acid generation.

4.5 Process Water

The process water quality can be estimated from the water from the 2004 SGS and 2008 XPS metallurgical waters after aging. The water quality is summarized in **Table 4.10**.

5.0 CONCLUSIONS AND RECOMMENDATIONS

The mine materials at the proposed Marathon PGM-Cu mine contain sulphide minerals and required assessment to evaluate the potential for acid generation and metal leaching. A laboratory testing program was completed to assess the characteristics of mine rock and process solids as well as to quantify loadings of COPC in different mine components such as mine rock stockpiles, the on-land low sulphur process solids storage facility, the underwater high sulphur storage facility and pit rock materials. The program results lead to the following conclusions;

- mine rock with a sulphur content that is less than 0.3% S will not generate acid and can be safely stored in on-land stockpiles,
- mine rock materials with a sulphur content greater than 0.3% sulphur represents only 6% of the total inventory and can be managed to prevent effects on the environment;
- the low sulphur process solids do not represent a risk of acid generation and can be stored safely in an on-land impoundment; and
- loading rates for COPC for materials have been quantified and will be used to estimate water quality concentrations when water balance estimates have been finalized.

6.0 REFERENCES

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TABLES

TABLE 1.1: Bulk Process Solids Decant Water Quality

Parameter	Units	PWQO ²	2004 Process Solids Decant Water ¹	
			Total	Dissolved
pH	---	6.5-8.5	8.9	-
Conductivity	uS/cm	No Value	368	-
Alkalinity	mg/L	No Value	152	-
Acidity	mg/L	No Value	<2	-
Sulphate (SO ₄)	mg/L	No Value	51	-
Chloride (Cl)	mg/L	No Value	28	-
Aluminum (Al)	mg/L	0.015 - 0.075 ³	175	0.3
Antimony (Sb)	mg/L	0.02	<0.003	0.003
Arsenic (As)	mg/L	0.005	0.005	0.001
Barium (Ba)	mg/L	No Value	0.6	0.01
Beryllium (Be)	mg/L	0.011 - 1.1 ⁴	0.001	<0.00002
Bismuth (Bi)	mg/L	No Value	0.0005	<0.00001
Boron (B)	mg/L	0.2	0.1	0.1
Cadmium (Cd)	mg/L	0.0001 - 0.0005 ⁴	0.001	<0.000003
Calcium (Ca)	mg/L	No Value	94	8.7
Chromium (Cr)	mg/L	0.001	0.3	0.001
Cobalt (Co)	mg/L	0.0009	0.1	0.0002
Copper (Cu)	mg/L	0.001 - 0.005 ⁴	0.9	0.0005
Iron (Fe)	mg/L	0.3	299	0.6
Lead (Pb)	mg/L	0.001 - 0.005 ⁴	0.2	0.0001
Lithium (Li)	mg/L	No Value	0.03	<0.002
Magnesium (Mg)	mg/L	No Value	147	1.8
Manganese (Mn)	mg/L	No Value	2.8	0.02
Mercury (Hg)	mg/L	0.0002	0.0001	<0.0001
Molybdenum (Mo)	mg/L	0.04	0.05	0.06
Nickel (Ni)	mg/L	0.025	0.5	0.003
Potassium (K)	mg/L	No Value	16	10.6
Selenium (Se)	mg/L	0.1	0.002	<0.001
Silicon (Si)	mg/L	No Value	146	3.8
Silver (Ag)	mg/L	0.0001	0.0003	<0.00001
Sodium (Na)	mg/L	No Value	86	69
Strontium (Sr)	Bq/L	No Value	1	0.1
Thallium (Tl)	mg/L	0.0003	0.0003	0.000004
Tin (Sn)	mg/L	No Value	0.004	0.003
Titanium (Ti)	mg/L	No Value	2.2	0.002
Uranium (U)	mg/L	0.005	0.001	0.0001
Vanadium (V)	mg/L	0.006	0.3	0.002
Zinc (Zn)	mg/L	0.02	1	0.03

NOTES:

1 - From Golder, 2008.

2 - PWQO = Provincial Water Quality Objectives (MOEE, 1999)

3 - pH Dependant

4 - Hardness Dependant

TABLE 3.1: Estimated Proportion of Rock Types in Mine Rock Stockpile

Rock Type	Estimated Proportion in Mine Rock Stocpile
Eastern Gabbro	70.45%
Two Duck Lake Gabbro	13.13%
Volcanics	10%
Gabbro Breccia	1.42%
Syenite	5%

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TABLE 3.2: Mine Rock Samples Selected for Humidity Cell Testing

Rock Type	Mine Rock Samples
Eastern Gabbro	MAR07-16, MAR07-18, MAR07-99
Two Duck Lake Gabbro	MAR07-15, MAR07-80, MAR07-98
Volcanics	MAR07-33, MAR07-96
Heterolithic Breccia	MAR07-49
Syenite	MAR07-92

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TABLE 3.3: Grain Size Distribution and Calculated Surface Area of Rock Sample in Humidity Cells.

Diameter (mm)	Mar07-15 % in Interval	Mar07-96 % in Interval	Average % in Interval	Mass Rock in HC (kg)	Average Specific Surface Area (m²/kg)	Total Surface Area (m²)
9.500	0.000	0.000	0.0	0.00	0.2	0.00
4.500	9.670	11.670	10.7	0.11	0.3	0.03
2.000	29.030	25.000	27.0	0.27	0.7	0.19
0.850	18.220	13.330	15.8	0.16	1.6	0.26
0.425	8.280	6.670	7.5	0.07	3.6	0.27
0.250	8.280	6.670	7.5	0.07	6.6	0.49
0.150	6.630	8.330	7.5	0.07	11.1	0.83
0.075	4.970	5.000	5.0	0.05	20.2	1.01
0.053	13.630	22.020	17.8	0.18	34.0	6.06
0.037	0.000	0.000	0.0	0.00	48.4	0.00
0.026	0.000	0.000	0.0	0.00	69.1	0.00
0.019	0.000	0.000	0.0	0.00	96.4	0.00
0.014	0.000	0.000	0.0	0.00	131.4	0.00
0.010	1.300	1.310	1.3	0.01	181.1	2.36
0.007	0.000	0.000	0.0	0.00	256.1	0.00
0.005	0.000	0.000	0.0	0.00	362.2	0.00
0.003	0.000	0.000	0.0	0.00	553.3	0.00
0.002	0.000	0.000	0.0	0.00	874.8	0.00
0.001	0.000	0.000	0.0	0.00	1179.3	0.00
Total Surface Area per 1 kg Sample						11.5

TABLE 4.1: Summary of Metal Content and Acid Base Accounting for Mine Rock Samples

Parameter	Units	10x Average Crustal Abundance ¹	2010 ABA and Metals Mine Rock Samples				2007 ABA and Metals Mine Rock Samples ²				2010 and 2007 Combined ABA and Metals Mine Rock Samples			
			Count	Geomean	Minimum	Maximum	Count	Geomean	Minimum	Maximum	Count	Geomean	Minimum	Maximum
Aluminum (Al)	%	84	200	1.25	0.30	4.41	99	6.7	1.80	11.0	299	2.2	0.3	11
Arsenic (As)	mg/kg	10	200	2.71	<2.0	11.0	99	1.1	1.00	26.0	299	2.0	1	26
Cadmium (Cd)	mg/kg	0.1	200	<0.5	<0.5	<0.5	99	0.2	0.00	3.6	299	0.4	0.0015	3.6
Cobalt (Co)	mg/kg	290	200	32.4	2.00	148	99	51.7	3.50	170	299	37.9	2	170
Copper (Cu)	mg/kg	750	200	121	4.00	2,130	99	170	15.00	6,300	299	136	4	6,300
Iron (Fe)	%	71	200	6.22	2.05	20.1	99	9.6	3.20	29.0	299	7.2	2.05	29
Molybdenum (Mo)	mg/kg	10	200	1.20	<1.0	31.0	99	1.0	0.22	12.0	299	1.1	0.22	31
Nickel (Ni)	mg/kg	1,050	200	64.1	<1.0	867	99	108	3.60	1,050	299	76.2	1	1,050
Lead (Pb)	mg/kg	80	200	2.65	<2.0	66.0	99	3.9	1.00	47.0	299	3.0	1	66
Selenium (Se)	mg/kg	0.5	Not Analyzed				99	0.7	0.50	6.0	99	0.7	0.5	6
Uranium (U)	mg/kg	9.1	200	<10	<10	<10	99	0.7	0.05	15.0	299	4.1	0.05	15
Vanadium (V)	mg/kg	2,300	200	138	1.00	1,005	99	211	6.00	1,600	299	159	1	1,600
Zinc (Zn)	mg/kg	800	200	60.8	18.0	233	99	108	28.00	280	299	73.5	18	280
Paste pH	---	---	200	9.26	8.10	9.90	99	9.73	8.86	10.2	299	9.41	8.10	10.2
Neutralization Potential (NP)	kg-CaCO ₃ /t	---	257	31.5	8.00	84.0	99	29.6	0.38	120	356	31.0	0.38	120
Acid Generating Potential (AP)	kg-CaCO ₃ /t	---	257	1.32	0.30	30.0	99	0.73	0.31	198	356	1.12	0.30	198
NP/AP Ratio	---	---	257	23.6	0.58	243	99	40.6	0.10	387	356	28.2	0.10	387
Total Sulphur	%	---	257	0.043	<0.01	0.96	99	0.040	<0.01	6.71	356	0.041	<0.01	6.71
Sulphide Sulphur	%	---	200	0.035	<0.01	0.84	99	0.023	<0.01	6.34	299	0.030	<0.01	6.34
Inorganic Carbon (C) ³	%	---	200	0.11	<0.05	0.76	99	0.11	<0.01	0.86	299	0.11	<0.01	0.86

NOTES:

1 - From Faure, Gunter. 1998. Principles and Applications of Geochemistry. Prentice Hall. New Jersey.

2 - From Golder, 2008

3 - Represents carbonate content

When value is reported as below detection, detection limit used for calculation of geometric mean.

TABLE 4.2: Summary of Metal Content and Acid Base Accounting for High and Low Sulphur Process Solid Samples

Parameter	Units	Bulk Process Solids	High Sulphur Process Solids	Low Sulphur Process Solids			
		Composite Sample	Composite Sample	2475-01	2475-02	2475-03	2475-04
Aluminum (Al)	%	3.03	2.6	0.61	0.6	0.56	0.57
Arsenic (As)	mg/kg	666 ¹	4.8	<0.5	<0.5	<0.5	<0.5
Cobalt (Co)	mg/kg	92	100	26	23	22	23
Copper (Cu)	mg/kg	161	1,800	110	89	99	83
Iron (Fe)	%	6.35	16	4.8	4.6	4.5	4.6
Molybdenum (Mo)	mg/kg	7	33	6.5	5.8	5.3	5.8
Nickel (Ni)	mg/kg	375	890	200	180	170	180
Lead (Pb)	mg/kg	5	11	2.1	1.7	1.7	1.6
Selenium (Se)	mg/kg	Not Analyzed	9.1	0.9	1.1	1.0	<0.7
Uranium (U)	mg/kg	<10	0.79	0.39	0.33	0.34	0.31
Vanadium (V)	mg/kg	234	160	170	170	170	170
Zinc (Zn)	mg/kg	46	200	31	28	28	29
Paste pH	---	8.8	7.64	8.52	8.83	8.88	8.74
Neutralization Potential (NP)	kg-CaCO ₃ /t	37	45.4	21.1	20.1	21.0	21.1
Acid Generating Potential (AP)	kg-CaCO ₃ /t	15.9	191	3.75	2.19	1.88	2.19
NP/AP Ratio	---	2.32	0.24	5.63	9.18	11.2	9.63
Total Sulphur	%	0.51	6.68	0.21	0.13	0.12	0.12
Sulphide Sulphur	%	0.5	6.11	0.12	0.07	0.06	0.07
Inorganic Carbon (C)	%	0.13	0.39	0.12	0.12	0.12	0.11

NOTES:

1 - Suspect value - to be re-analyzed

Table 4.3. Summary of COPC Correlations for Mine Rock Loading Rates

COPC	Function:	Metal Content used in Correlation Function (mg/kg)	Comments:	Loading Rate (mg/kg/wk)	Loading Rate (mg/m ² /wk)
Sulphate (SO ₄ ²⁻)	$f(S^{2-}) = 9.4907(S^{2-})^{0.695}$	-	Function derived from all humidity cell samples with sulphide contents < 1 %S	0.73 ²	0.06
Aluminum (Al)	Constant Concentration	-	Concentration based on humidity cell values, excluding sample MAR07-96	0.032 ¹	0.032 ¹
Arsenic (As)	Constant Loading	-	Loading rate based on humidity cell values, excluding sample MAR07-16 and MAR07-15 ³	0.0017	0.00014
Cadmium (Cd)	$f(S^{2-}) = 4*10^{-6}(S^{2-}) + 2*10^{-6}$	-	Function derived from all humidity cell samples	2.10E-06 ²	1.83E-07
Cobalt (Co)	$f(Co) = 4*10^{-6} e^{(0.0498*(Co))}$	38.2	Function derived from all humidity cell samples, excluding MAR07-96	2.68E-05	2.33E-06
Copper (Cu)	$f(S^{2-}) = 0.0022(S^{2-})^{0.3699}$	-	Function derived from all humidity cell samples with sulphide contents < 2 %S	0.00056 ²	4.87E-05
Iron (Fe)	Constant Concentration	-	Iron Solubility at pH = 7 (Ref: Langmuir (1997))	0.0044 ¹	0.0044 ¹
Molybdenum (Mo)	Constant Loading	-	Loading rate based on humidity cell values, excluding sample MAR07-16 and MAR07-15 ³	0.00021	1.81E-05
Nickel (Ni)	$f(Ni) = 6*10^{-5} e^{(0.0071*(Ni))}$	77.5	Function derived from all humidity cell samples, excluding MAR07-96	0.00010	9.05E-06
Lead (Pb)	$f(Pb) = 2*10^{-6}(Pb) + 2*10^{-5}$	2.9	Function derived from all humidity cell samples	2.59E-05	2.25E-06
Selenium (Se)	Constant Loading	-	Loading rate based on humidity cell values, excluding sample MAR07-16 and MAR07-15 ³ . Data values with <D.L. were averaged as 1/2 the D.L.	0.00048	4.18E-05
Uranium (U)	Constant Loading	-	Loading rate based on all humidity cells, excluding sample MAR07-16 and MAR07-15 ³	0.00018	1.54E-05
Vanadium (V)	Constant Loading	-	Loading rate based on all humidity cells, excluding sample MAR07-16 and MAR07-15 ³	0.00043	3.75E-05
Zinc (Zn)	$f(S^{2-}) = 0.0009 e^{(0.2386*(S^{2-}))}$	-	Function derived from all humidity cell samples with sulphide contents < 2 %S	0.00091 ²	7.91E-05

NOTES:

1 - Constant concentration in mg/L

2 - Sulphide content in stockpile is 0.025 %S, as shown in Table #.1B

3 - MAR07-15 and MAR07-16 contain material considered to represent ore rather than mine rock based on NSR values

Table 4.4. Loading Rates for Low-Sulphur Process Solids from Humidity Cells

COPC	Units	2475-01	2475-02	2475-03	2475-04	Geomean
Sulphate (SO ₄ ²⁻)	mg/kg/wk	10.56	7.18	4.11	4.49	6.11
Aluminum (Al)	mg/kg/wk	0.089	0.116	0.110	0.111	0.106
Arsenic (As)	mg/kg/wk	0.0010	0.0010	0.0010	0.0010	0.0010
Cadmium (Cd)	mg/kg/wk	0.0001	0.0001	0.0001	0.0001	0.0001
Cobalt (Co)	mg/kg/wk	0.0005	0.0005	0.0005	0.0005	0.0005
Copper (Cu)	mg/kg/wk	0.0012	0.0011	0.0012	0.0013	0.0012
Iron (Fe)	mg/kg/wk	0.05	0.05	0.05	0.05	0.05
Molybdenum (Mo)	mg/kg/wk	0.0010	0.0010	0.0010	0.0011	0.0010
Nickel (Ni)	mg/kg/wk	0.0020	0.0020	0.0020	0.0020	0.0020
Lead (Pb)	mg/kg/wk	0.0010	0.0010	0.0010	0.0010	0.0010
Selenium (Se)	mg/kg/wk	0.0049	0.0048	0.0049	0.0049	0.0049
Uranium (U)	mg/kg/wk	0.0049	0.0048	0.0049	0.0049	0.0049
Vanadium (V)	mg/kg/wk	0.0010	0.0013	0.0013	0.0011	0.0011
Zinc (Zn)	mg/kg/wk	0.0042	0.0038	0.0043	0.0063	0.0045

NOTES:

1 - Loading rate calculations for As, Cd, Co, Fe, Ni, Pb, Se, and U are heavily influenced by less than detection (<D.L.) values, as at least 90% of the values were <D.L. Loading rate values therefore represent maximum value.

2 - Values represent average loading rates from humidity cell tests from week 4 to current.

Table 4.5. Preliminary Fluxes for Submerged High-Sulphur Process Solids from Columns

COPC	Units	Column 1	Column 2	Geomean
Sulphate (SO ₄ ²⁻)	(mg/m ² /wk)	10870.1	9740.3	10289.7
Aluminum (Al) ²	(mg/m ² /wk)	0.35	0.36	0.36
Arsenic (As)	(mg/m ² /wk)	0.019	0.047	0.030
Cadmium (Cd)	(mg/m ² /wk)	0.0015	0.0015	0.0015
Cobalt (Co)	(mg/m ² /wk)	0.026	0.026	0.026
Copper (Cu)	(mg/m ² /wk)	0.193	0.180	0.186
Iron (Fe) ²	(mg/m ² /wk)	1.50	1.50	1.50
Molybdenum (Mo)	(mg/m ² /wk)	0.423	0.386	0.404
Nickel (Ni)	(mg/m ² /wk)	0.305	0.298	0.301
Lead (Pb)	(mg/m ² /wk)	0.008	0.008	0.008
Selenium (Se)	(mg/m ² /wk)	0.055	0.042	0.048
Uranium (U)	(mg/m ² /wk)	0.0283	0.0242	0.0262
Vanadium (V)	(mg/m ² /wk)	0.016	0.016	0.016
Zinc (Zn)	(mg/m ² /wk)	0.08	0.08	0.08

NOTES:

- 1 - Flux calculations for Cd, Fe, Pb, and Zn are heavily influenced by less than detection (<D.L.) values, as at least 90% of the values were <D.L. Flux values therefore represent maximum values.
- 2 - Dependent on geochemical characteristics of solubility and pH control
- 3 - Flux values based on data from week 1 to 5 of testing. Testing is still continuing.

Table 4.6. Fluxes for Submerged Bulk Process Solids from Columns

COPC	Units	Column A	Column B	Geomean
Sulphate (SO ₄ ²⁻)	mg/m ² /wk	386.07	748.20	537.45
Aluminum (Al)	mg/m ² /wk	0.213	0.256	0.233
Arsenic (As)	mg/m ² /wk	0.014	0.014	0.014
Cadmium (Cd)	mg/m ² /wk	0.0015	0.0014	0.0015
Cobalt (Co)	mg/m ² /wk	0.007	0.007	0.007
Copper (Cu)	mg/m ² /wk	0.014	0.014	0.014
Iron (Fe)	mg/m ² /wk	0.707	0.707	0.707
Molybdenum (Mo)	mg/m ² /wk	0.313	0.259	0.285
Nickel (Ni)	mg/m ² /wk	0.028	0.028	0.028
Lead (Pb)	mg/m ² /wk	0.014	0.014	0.014
Selenium (Se)	mg/m ² /wk	0.071	0.071	0.071
Uranium (U)	mg/m ² /wk	0.071	0.071	0.071
Vanadium (V)	mg/m ² /wk	0.014	0.014	0.014
Zinc (Zn)	mg/m ² /wk	0.023	0.067	0.039

NOTES:

1 - Flux calculations for As, Cd, Co, Cu, Fe, Ni, Pb, Se, U, and V are heavily influenced by less than detection (<D.L.) values, as at least 90% of the values were <D.L. Flux values therefore represent maximum value.

2 - Flux values represent average of calculated flux values from week 4 to termination to account for initial flushing period from week 0 to 4.

Table 4.7. Summary of COPC Loading Rates from Laboratory and for the Field Adjusted Values

	Mine Rock		Low-Sulphur Process Solids		High-Sulphur Process Solids		Pit Walls	
COPC	Laboratory Rate (mg/kg/wk)	Field Rate ¹ (mg/kg/wk)	Laboratory Rate (mg/kg/wk)	Field Rate ² (mg/kg/wk)	Laboratory Rate (mg/m ² /wk)	Field Rate ³ (mg/m ² /wk)	Laboratory Rate (mg/m ² /wk)	Field Rate ² (mg/m ² /wk)
Sulphate (SO ₄ ²⁻)	0.73	0.0012	6.11	1.04	10289.7	10289.7	0.06	0.0108
Aluminum (Al) ⁴	0.032 ⁵	5.44E-05	0.106	0.018	0.358	0.358	0.032 ⁵	0.00051
Arsenic (As)	0.0017	2.82E-06	0.0010	0.00017	0.030	0.030	0.00014	2.45E-05
Cadmium (Cd)	2.10E-06	3.57E-09	0.00010	0.000017	0.0015	0.0015	1.83E-07	3.10E-08
Cobalt (Co)	2.68E-05	4.56E-08	0.00049	0.000083	0.026	0.026	2.33E-06	3.96E-07
Copper (Cu)	0.00056	9.52E-07	0.0012	0.00020	0.186	0.186	4.87E-05	8.28E-06
Iron (Fe) ⁴	0.0044 ⁵	7.48E-06	0.049	0.0084	1.50	1.50	0.0044 ⁵	6.46E-05
Molybdenum (Mo)	0.00021	3.55E-07	0.0010	0.00017	0.404	0.404	1.81E-05	3.08E-06
Nickel (Ni)	0.00010	1.77E-07	0.0020	0.00033	0.301	0.301	9.05E-06	1.54E-06
Lead (Pb)	2.59E-05	4.40E-08	0.0010	0.00017	0.0075	0.0075	2.25E-06	3.82E-07
Selenium (Se)	0.00048	8.18E-07	0.0049	0.00083	0.048	0.048	4.18E-05	7.11E-06
Uranium (U)	0.00018	3.01E-07	0.0049	0.00083	0.026	0.026	1.54E-05	2.62E-06
Vanadium (V)	0.00043	7.34E-07	0.0011	0.00019	0.016	0.016	3.75E-05	6.38E-06
Zinc (Zn)	0.00091	1.55E-06	0.0045	0.00077	0.075	0.075	7.91E-05	1.35E-05

NOTES:

1 - Adjusted for surface area (particle size) and temperature

2 - Adjusted for temperature

3 - No Adjustment

4 - Dependent on geochemical characteristics of solubility and pH control

5 - Constant concentration in mg/L

TABLE 4.8: Summary of Metal Content and Acid Base Accounting for Mine Rock Samples with Total Sulphur Content Less than 0.3%

Parameter	Units	10x Average Crustal Abundance ¹	2010 ABA and Metals Mine Rock Samples				2007 ABA and Metals Mine Rock Samples ²				2010 and 2007 Combined ABA and Metals Mine Rock Samples			
			Count	Geomean	Minimum	Maximum	Count	Geomean	Minimum	Maximum	Count	Geomean	Minimum	Maximum
Aluminum (Al)	%	84	189	1.25	0.30	4.41	90	6.8	2.90	11.0	279	2.2	0.3	11
Arsenic (As)	mg/kg	10	189	2.71	<2.0	11.0	90	1.1	1.00	13.0	279	2.0	1	13
Cadmium (Cd)	mg/kg	0.1	189	<0.5	<0.5	<0.5	90	0.2	0.00	3.6	279	0.3	0.0015	3.6
Cobalt (Co)	mg/kg	290	189	32.6	2.00	148	90	53.4	3.50	170	279	38.2	2	170
Copper (Cu)	mg/kg	750	189	114	4.00	2,130	90	151	16.00	1,900	279	125	4	2,130
Iron (Fe)	%	71	189	6.24	2.05	20.1	90	9.9	3.20	25.0	279	7.2	2.05	25
Molybdenum (Mo)	mg/kg	10	189	1.20	<1.0	31.0	90	1.0	0.22	12.0	279	1.1	0.22	31
Nickel (Ni)	mg/kg	1,050	189	65.7	<1.0	867	90	110	3.60	1,050	279	77.5	1	1,050
Lead (Pb)	mg/kg	80	189	2.64	<2.0	66.0	90	3.7	1.00	47.0	279	2.9	1	66
Selenium (Se)	mg/kg	0.5	Not Analyzed				90	0.7	0.50	3.0	90	0.7	0.5	3
Uranium (U)	mg/kg	9.1	189	<10	<10	<10	90	0.6	0.08	15.0	279	4.1	0.08	15
Vanadium (V)	mg/kg	2,300	189	140	1.00	1,005	90	218	6.00	1,600	279	162	1	1,600
Zinc (Zn)	mg/kg	800	189	61.8	18.0	233	90	109	28.00	280	279	74.2	18	280
Paste pH	---	---	189	9.27	8.10	9.90	90	9.76	8.86	10.2	279	9.43	8.10	10.2
Neutralization Potential (NP)	kg-CaCO ₃ /t	---	245	31.5	8.00	84.0	90	29.6	0.38	120	335	31.0	0.38	120
Acid Generating Potential (AP)	kg-CaCO ₃ /t	---	245	1.18	0.30	9.1	90	0.52	0.31	4	335	0.95	0.30	9
NP/AP Ratio	---	---	245	26.5	1.83	243	90	56.4	1.22	387	335	32.5	1.22	387
Total Sulphur	%	---	245	0.038	<0.01	0.29	90	0.029	<0.01	0.26	335	0.036	<0.01	0.29
Sulphide Sulphur	%	---	189	0.030	<0.01	0.24	90	0.017	<0.01	0.12	279	0.025	<0.01	0.24
Inorganic Carbon (C) ³	%	---	189	0.11	<0.05	0.76	90	0.11	<0.01	0.58	279	0.11	<0.01	0.76

NOTES:

1 - From Faure, Gunter. 1998. Principles and Applications of Geochemistry. Prentice Hall. New Jersey.

2 - From Golder, 2008

3 - Represents carbonate content

When value is reported as below detection, detection limit used for calculation of geometric mean.

TABLE 4.9: Summary of Metal Content and Acid Base Accounting for Mine Rock Samples with Total Sulphur Content Greater than 0.3%

Parameter	Units	10x Average Crustal Abundance ¹	2010 ABA and Metals Mine Rock Samples				2007 ABA and Metals Mine Rock Samples ²				2010 and 2007 Combined ABA and Metals Mine Rock Samples			
			Count	Geomean	Minimum	Maximum	Count	Geomean	Minimum	Maximum	Count	Geomean	Minimum	Maximum
Aluminum (Al)	%	84	11	1.38	0.76	2.36	9	6.5	1.80	8.2	20	2.8	0.76	8.2
Arsenic (As)	mg/kg	10	11	2.76	<2.0	8.0	9	1.7	1.00	26.0	20	2.2	1	26
Cadmium (Cd)	mg/kg	0.1	11	<0.5	<0.5	<0.5	9	0.3	0.14	0.9	20	0.4	0.14	0.89
Cobalt (Co)	mg/kg	290	11	29.8	9.00	54	9	37.5	5.40	130	20	33.1	5	130
Copper (Cu)	mg/kg	750	11	345	71.0	1,810	9	563	15.0	6,300	20	430	15	6,300
Iron (Fe)	%	71	11	5.79	2.86	10.7	9	7.2	3.40	29.0	20	6.4	2.86	29
Molybdenum (Mo)	mg/kg	10	11	1.25	<1.0	3.0	9	1.1	0.47	3.7	20	1.2	0.47	3.7
Nickel (Ni)	mg/kg	1,050	11	42.3	<5.0	362	9	93	4.50	380	20	60.4	4.5	380
Lead (Pb)	mg/kg	80	11	2.80	<2.0	4.0	9	7.2	2.30	12.0	20	4.3	2	12
Selenium (Se)	mg/kg	0.5	Not Analyzed				9	1.3	0.50	6.0	9	1.3	0.5	6
Uranium (U)	mg/kg	9.1	11	<10	<10	<10	9	0.9	0.05	15.0	20	3.3	0.05	15
Vanadium (V)	mg/kg	2,300	11	109	50.0	260	9	148	19.0	1,600	20	125	19	1,600
Zinc (Zn)	mg/kg	800	11	46.1	24.0	104	9	98	60.0	280	20	64.8	24	280
Paste pH	---	---	11	9.08	8.20	9.60	9	9.44	9.00	9.8	20	9.24	8.20	9.8
Neutralization Potential (NP)	kg-CaCO ₃ /t	---	12	31.4	16.0	52.0	9	29.1	15.5	66	21	30.4	15.5	66
Acid Generating Potential (AP)	kg-CaCO ₃ /t	---	12	14.9	9.70	30.0	9	18.88	4.50	198	21	16.5	4.50	198
NP/AP Ratio	---	---	12	2.1	0.58	5	9	1.5	0.10	15	21	1.8	0.10	15
Total Sulphur	%	---	12	0.48	<0.31	0.96	9	0.91	<0.34	6.71	21	0.63	<0.31	6.71
Sulphide Sulphur	%	---	11	0.44	<0.31	0.84	9	0.60	<0.14	6.34	20	0.50	<0.14	6.34
Inorganic Carbon (C) ³	%	---	11	0.13	<0.05	0.36	9	0.17	<0.05	0.86	20	0.14	<0.05	0.86

NOTES:

1 - From Faure, Gunter. 1998. Principles and Applications of Geochemistry. Prentice Hall. New Jersey.

2 - From Golder, 2008

3 - Represents carbonate content

When value is reported as below detection, detection limit used for calculation of geometric mean.

TABLE 4.10: Bulk Process Solids Decant Water Quality

Parameter	Units	PWQO ²	2004 Process Solids Decant Water ¹		2008 Process Solids Decant Water
			Total	Dissolved	Dissolved
pH	---	6.5-8.5	8.9	-	7.4
Conductivity	uS/cm	No Value	368	-	370
Alkalinity	mg/L	No Value	152	-	Not Measured
Acidity	mg/L	No Value	<2	-	5.0
Sulphate (SO ₄)	mg/L	No Value	51	-	96
Chloride (Cl)	mg/L	No Value	28	-	Not Measured
Aluminum (Al)	mg/L	0.015 - 0.075 ³	175	0.3	0.034
Antimony (Sb)	mg/L	0.02	<0.003	0.003	<0.005
Arsenic (As)	mg/L	0.005	0.005	0.001	<0.001
Barium (Ba)	mg/L	No Value	0.6	0.01	<0.01
Beryllium (Be)	mg/L	0.011 - 1.1 ⁴	0.001	<0.00002	<0.001
Bismuth (Bi)	mg/L	No Value	0.0005	<0.00001	<0.001
Boron (B)	mg/L	0.2	0.1	0.1	0.067
Cadmium (Cd)	mg/L	0.0001 - 0.0005 ⁴	0.001	<0.000003	0.00039
Calcium (Ca)	mg/L	No Value	94	8.7	21.1
Chromium (Cr)	mg/L	0.001	0.3	0.001	0.0010
Cobalt (Co)	mg/L	0.0009	0.1	0.0002	<0.0005
Copper (Cu)	mg/L	0.001 - 0.005 ⁴	0.9	0.0005	<0.001
Iron (Fe)	mg/L	0.3	299	0.6	<0.05
Lead (Pb)	mg/L	0.001 - 0.005 ⁴	0.2	0.0001	<0.001
Lithium (Li)	mg/L	No Value	0.03	<0.002	Not Measured
Magnesium (Mg)	mg/L	No Value	147	1.8	3.59
Manganese (Mn)	mg/L	No Value	2.8	0.02	0.0132
Mercury (Hg)	mg/L	0.0002	0.0001	<0.0001	Not Measured
Molybdenum (Mo)	mg/L	0.04	0.05	0.06	0.0836
Nickel (Ni)	mg/L	0.025	0.5	0.003	0.0035
Potassium (K)	mg/L	No Value	16	10.6	18.6
Selenium (Se)	mg/L	0.1	0.002	<0.001	<0.005
Silicon (Si)	mg/L	No Value	146	3.8	2.61
Silver (Ag)	mg/L	0.0001	0.0003	<0.00001	<0.0001
Sodium (Na)	mg/L	No Value	86	69	51.3
Strontium (Sr)	Bq/L	No Value	1	0.1	0.196
Thallium (Tl)	mg/L	0.0003	0.0003	0.000004	<0.0003
Tin (Sn)	mg/L	No Value	0.004	0.003	<0.001
Titanium (Ti)	mg/L	No Value	2.2	0.002	<0.002
Uranium (U)	mg/L	0.005	0.001	0.0001	<0.005
Vanadium (V)	mg/L	0.006	0.3	0.002	<0.001
Zinc (Zn)	mg/L	0.02	1	0.03	0.0131

NOTES:

1 - From Golder, 2008.

2 - PWQO = Provincial Water Quality Objectives (MOEE, 1999)

3 - pH Dependant

4 - Hardness Dependant

DRAFT

FIGURES



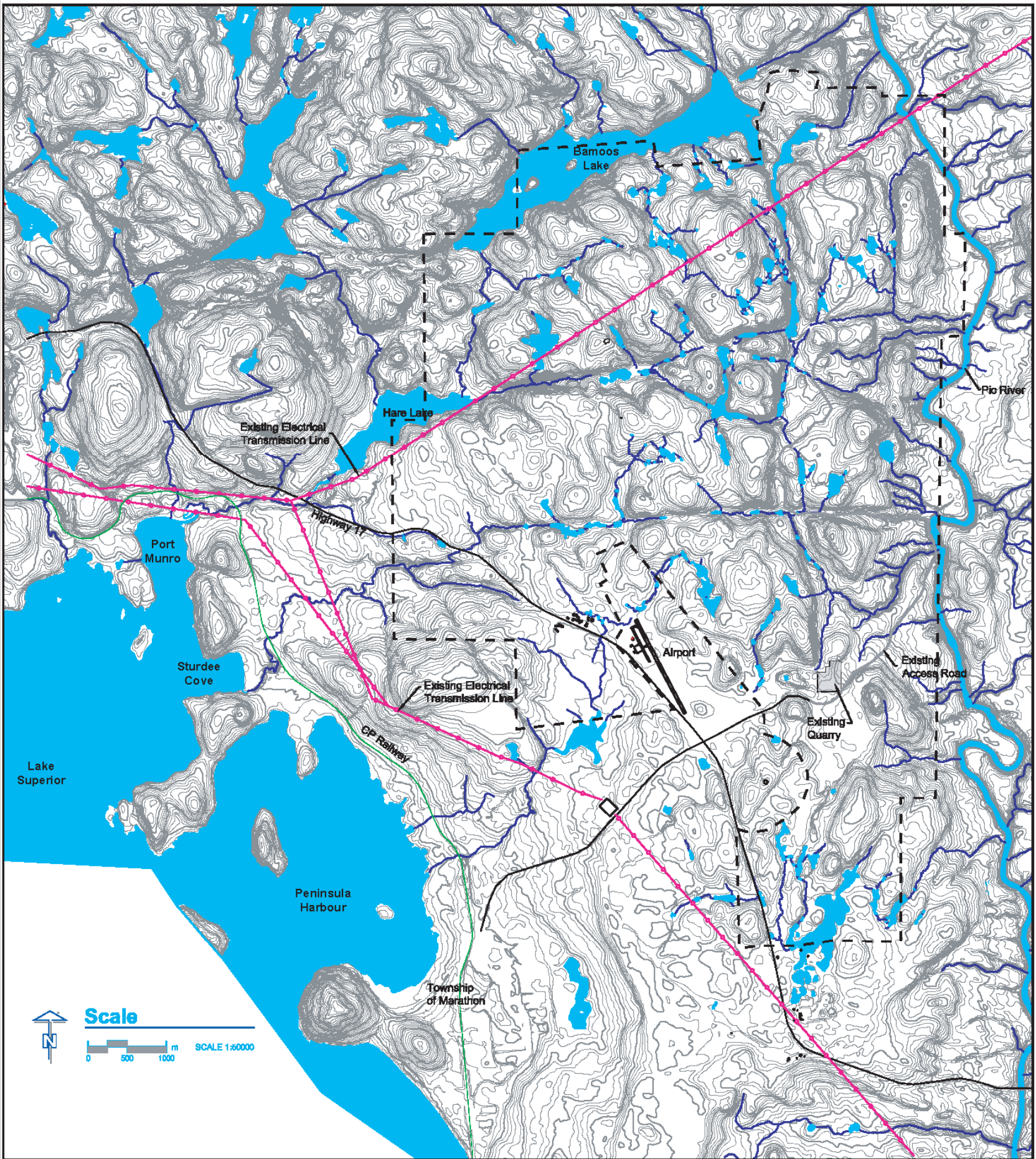
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Kilometres

Marathon PGM

Location of the Proposed Marathon PGM-Cu
Project Site Near Marathon, Ontario



Figure 1.1



Drawn By	CL	Date	Jan 28, 2010
Reviewed By	BF	Date	Jan 28, 2010
Revised By	KP	Date	July 15, 2010
Approved By	BF	Date	July 15, 2010
Revised By	KP	Date	Nov 29, 2011
Approved By	BF	Date	Nov 29, 2011

Stillwater Canada Inc.		
Existing Conditions at the Marathon PGM-Cu Project Site		
	November 2011	Figure 1.2

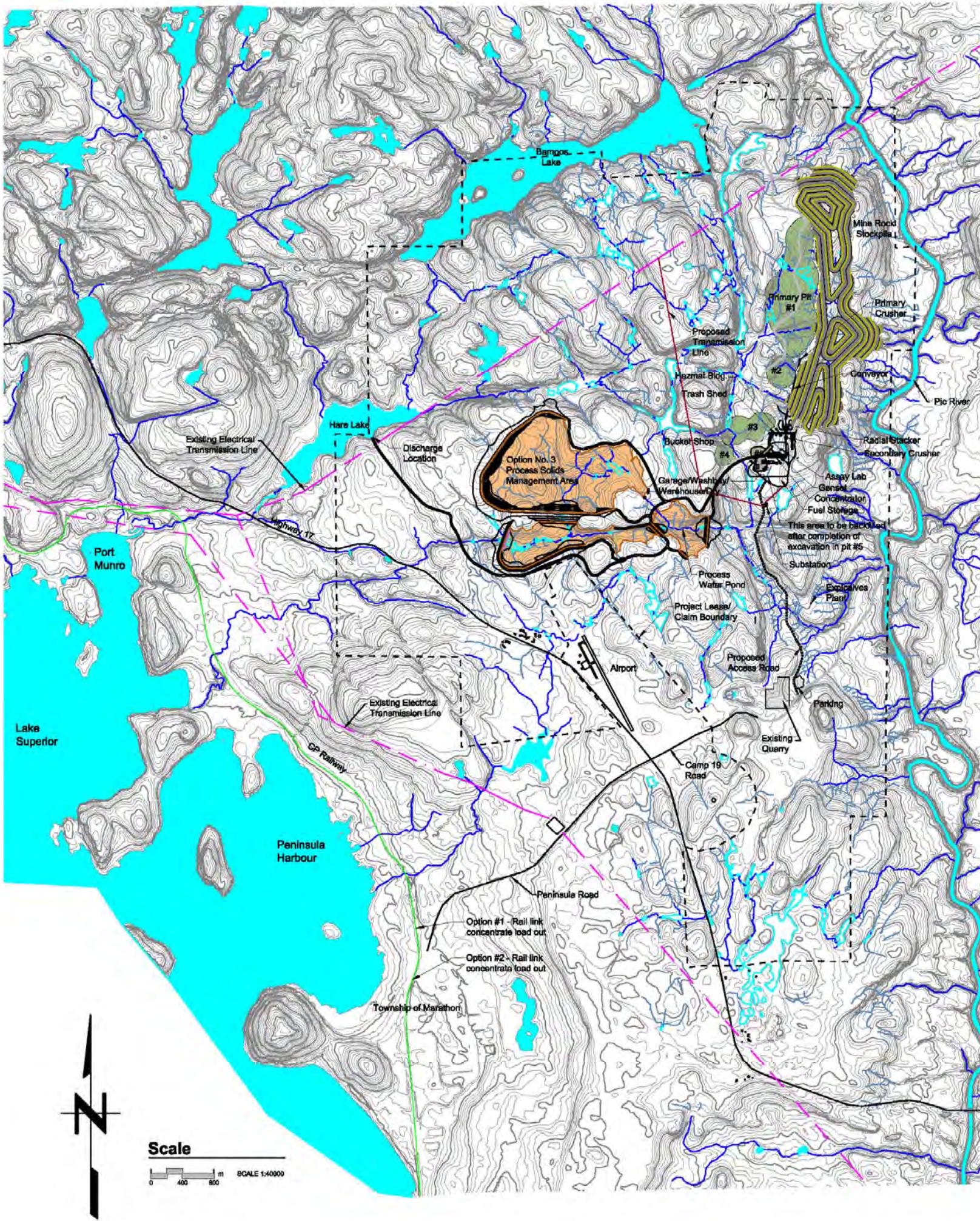
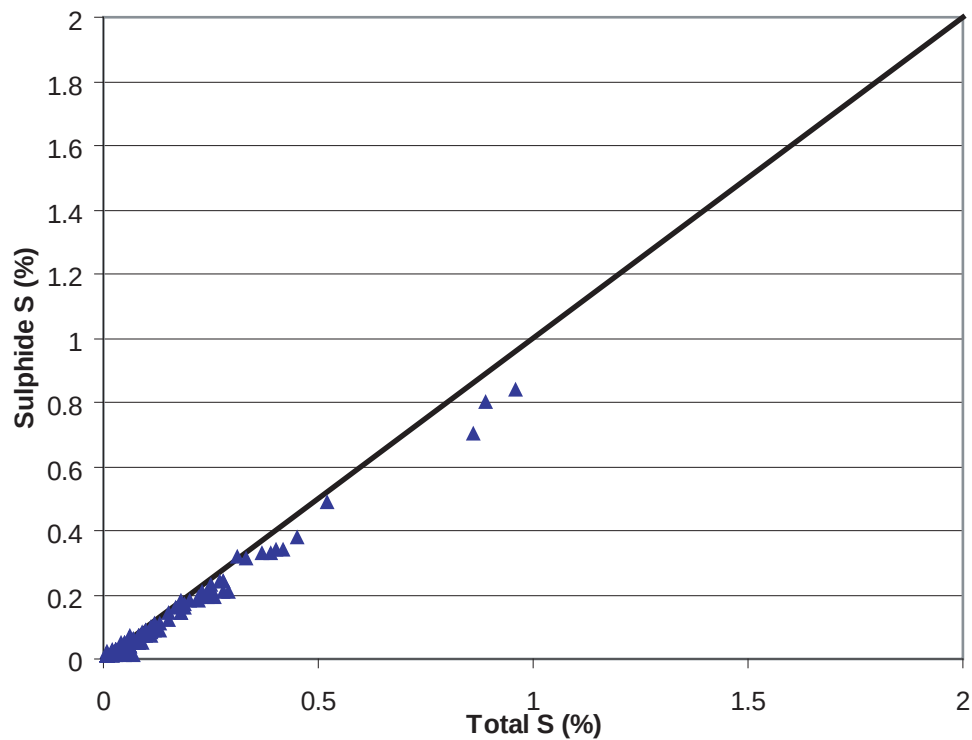


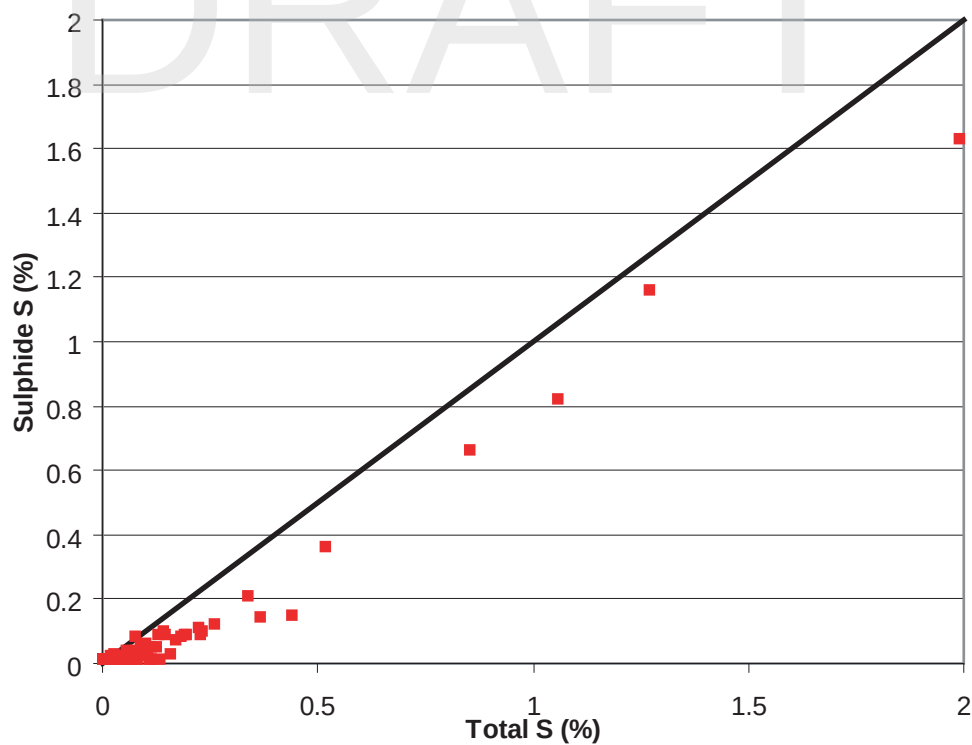
Figure 1.3

 STILLWATER CANADA INC.	NORDMIN RESOURCE & INDUSTRIAL ENGINEERING NORDMIN ENGINEERING LTD., 1139 Alloy Dr., Suite 224 Thunder Bay, ON, P7B 6M8 Phone: (807) 683-1730, Fax: (807) 683-1744 www.nordmin.com	DESIGNED BY: DRAWN BY: J. FILOGRANA CHECKED BY: APPROVED BY: DATE: OCT.17-2011	CLIENT DWG No.: CLIENT / PROPERTY: PROJECT: MARATHOM PGM - CU PROJECT STILLWATER CANADA INC. OVERALL SITE LAYOUT IMPROVED OPTION 3 PSMF
			SCALE: AS NOTED PROJ. NO. 11020-01 DWG. NO. A1-10-01-005 REV. NO. A

2010 ABA Mine Rock Samples



2007 ABA Mine Rock Samples



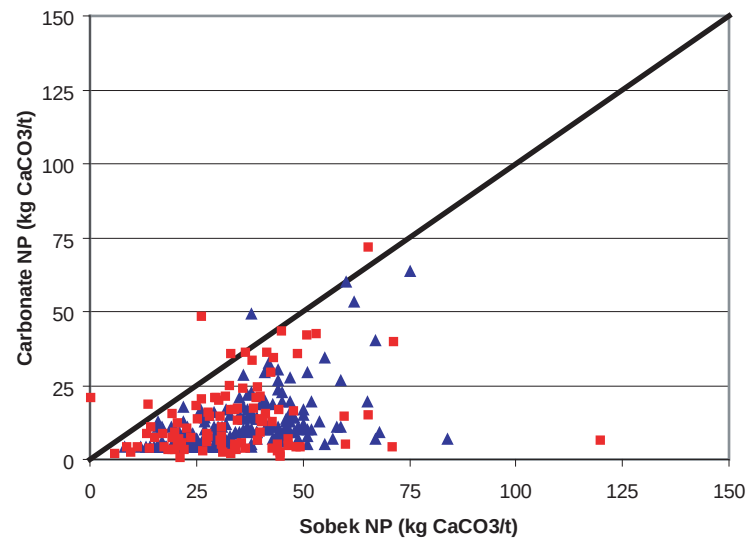
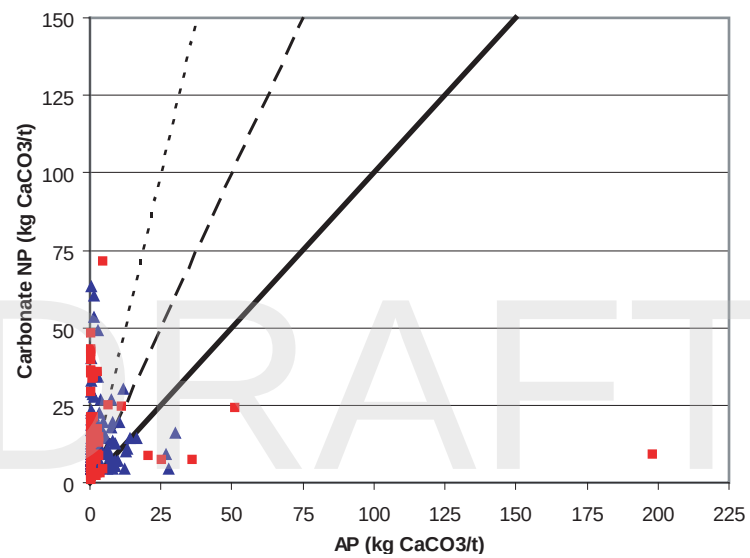
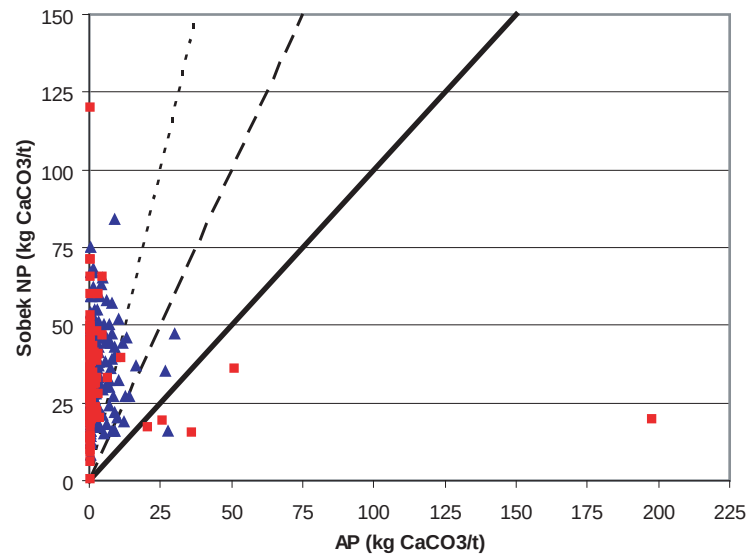
Note: 2007 data excludes one sample with
Total S = 6.71% and Sulphide S = 6.34%

Marathon PGM

Correlation Between Total Sulphur and
Sulphide Sulphur in Mine Rock



Figure 4.1



- 2007 ABA Data
- ▲ 2010 ABA Data
- NP/AP = 1
- - NP/AP = 2
- · · NP/AP = 4

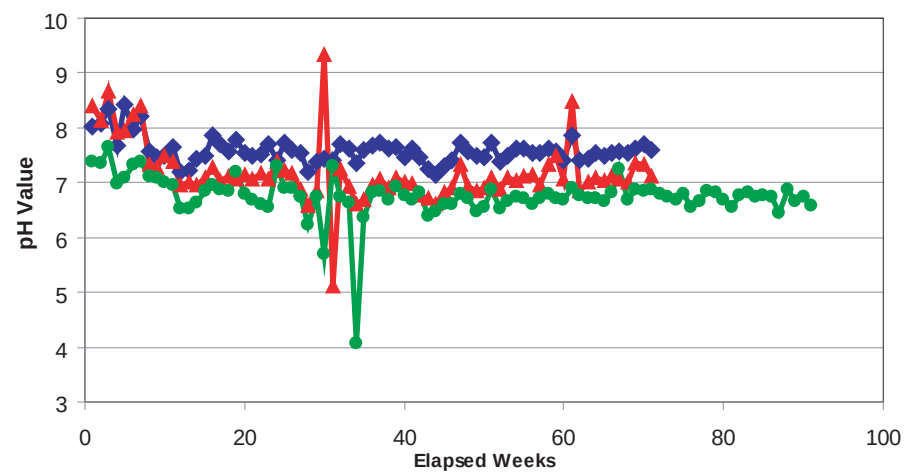
Marathon PGM

Summary of Neutralization Potential and
Acid Generation Potential in Mine Rock

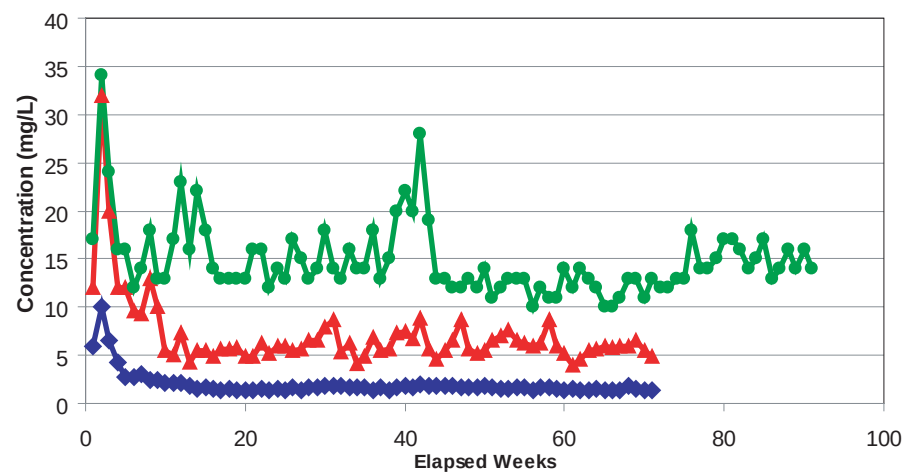


Figure 4.2

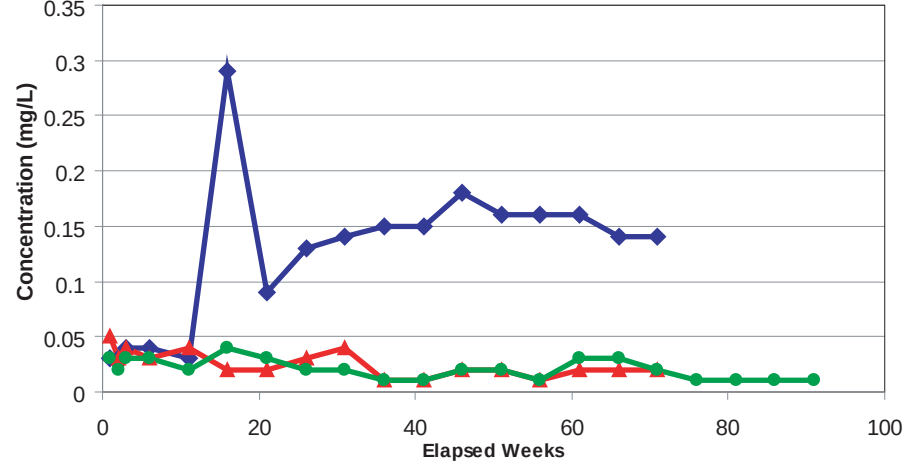
Leachate pH



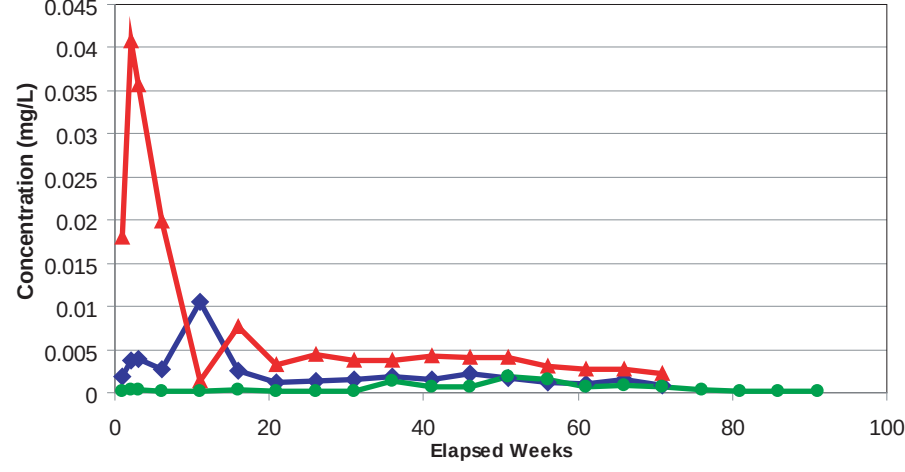
Sulphate



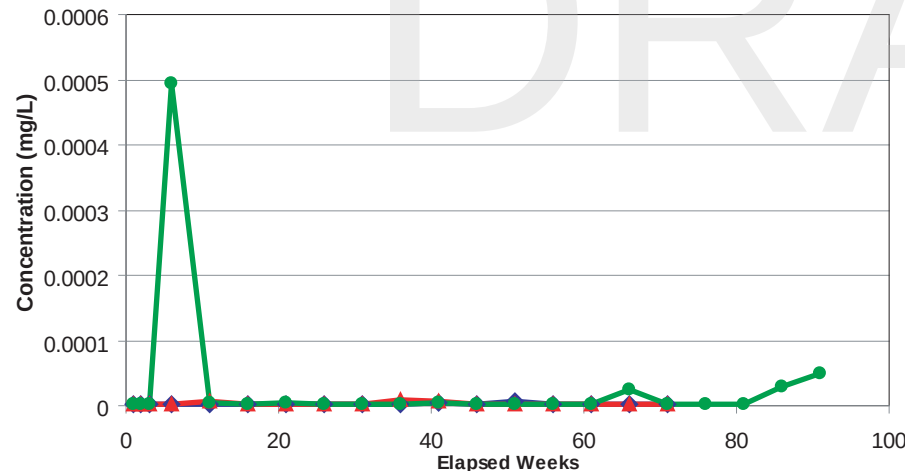
Aluminum



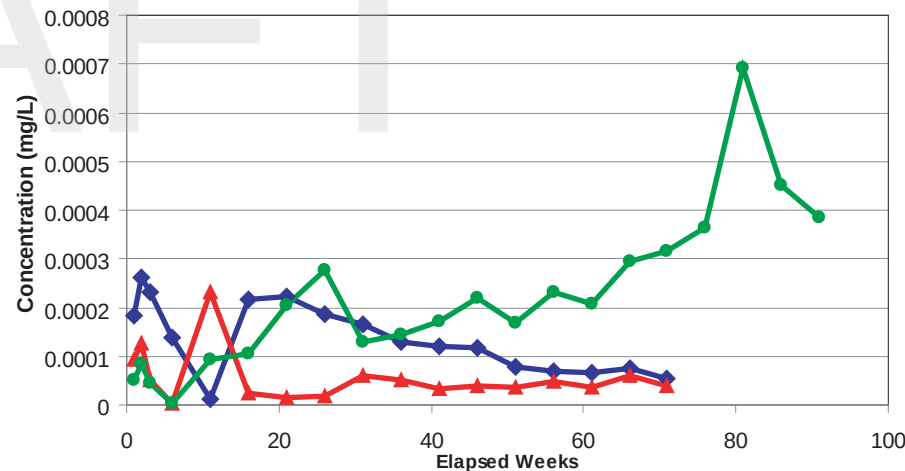
Arsenic



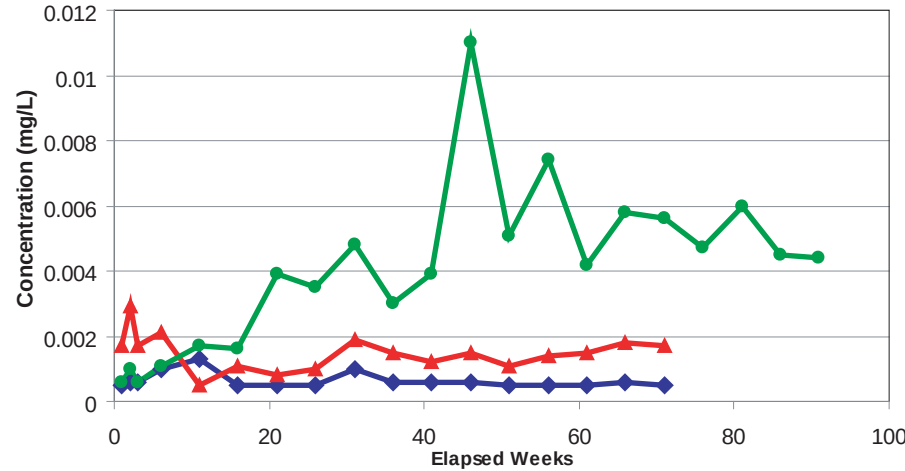
Cadmium



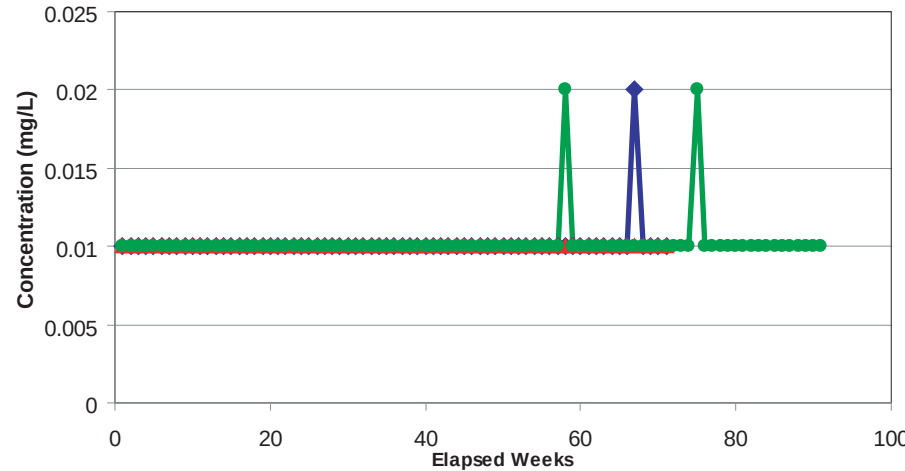
Cobalt



Copper

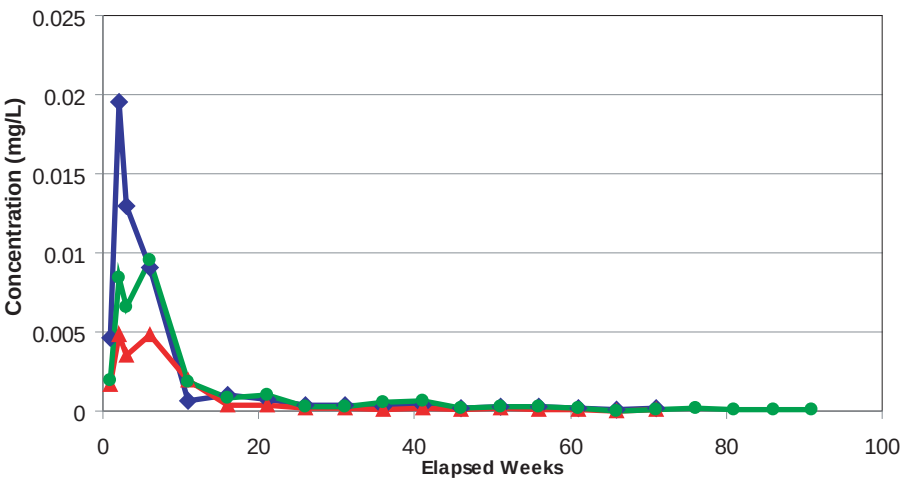


Iron

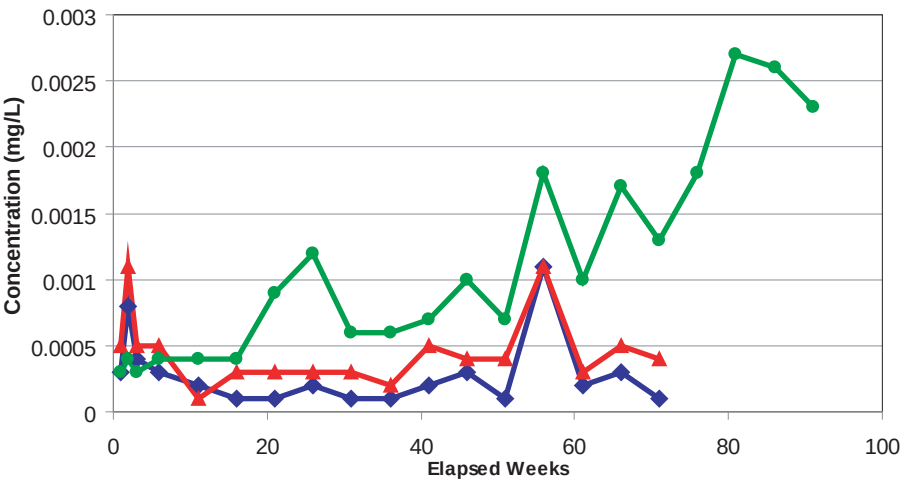


MAR07-16 ($S_T = 4.37\%$)
MAR07-18 ($S_T = 0.19\%$)
MAR07-99 ($S_T = 0.52\%$)

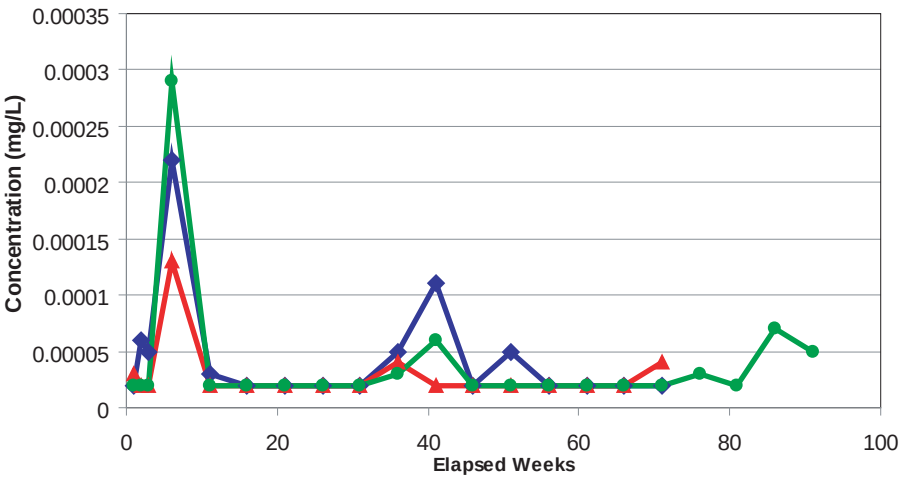
Molybdenum



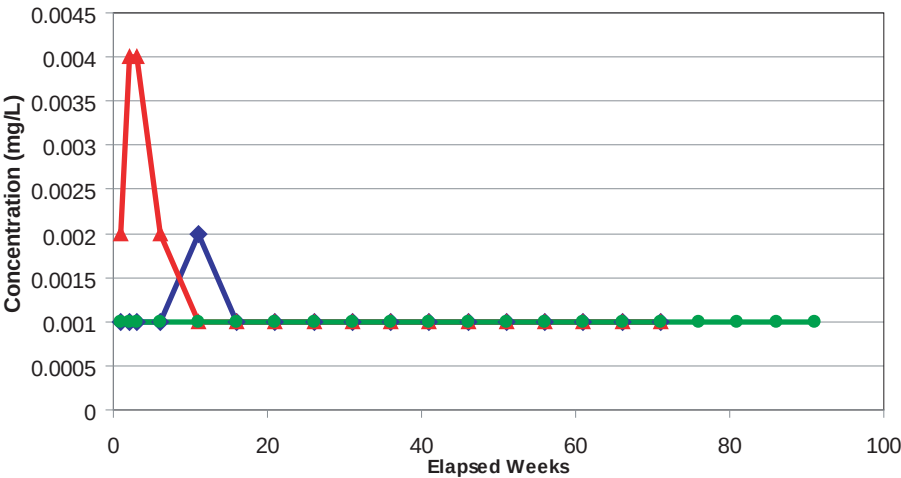
Nickel



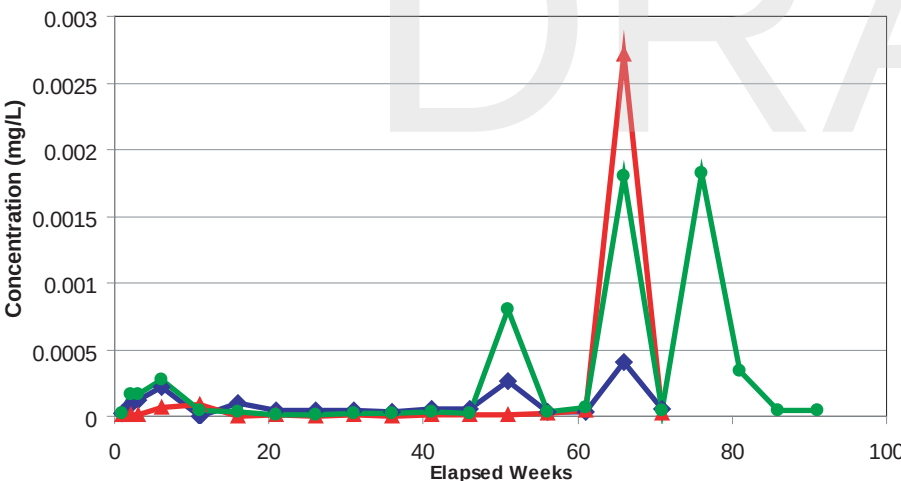
Lead



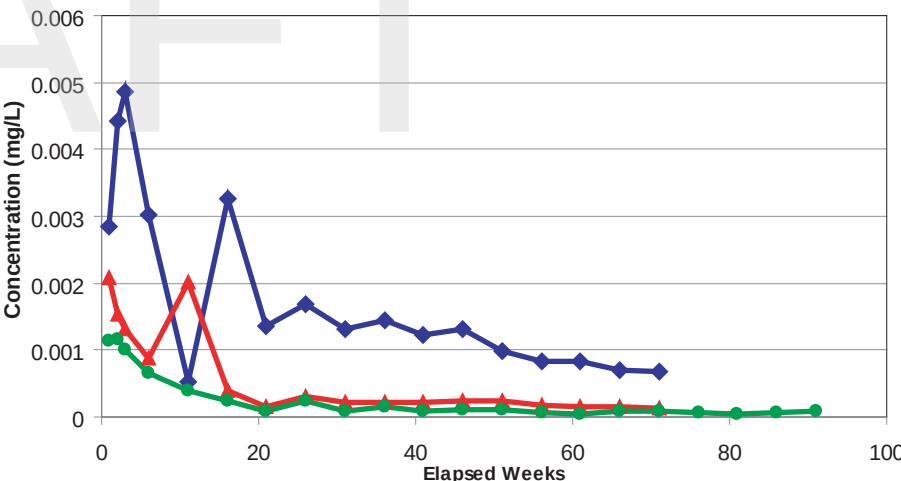
Selenium



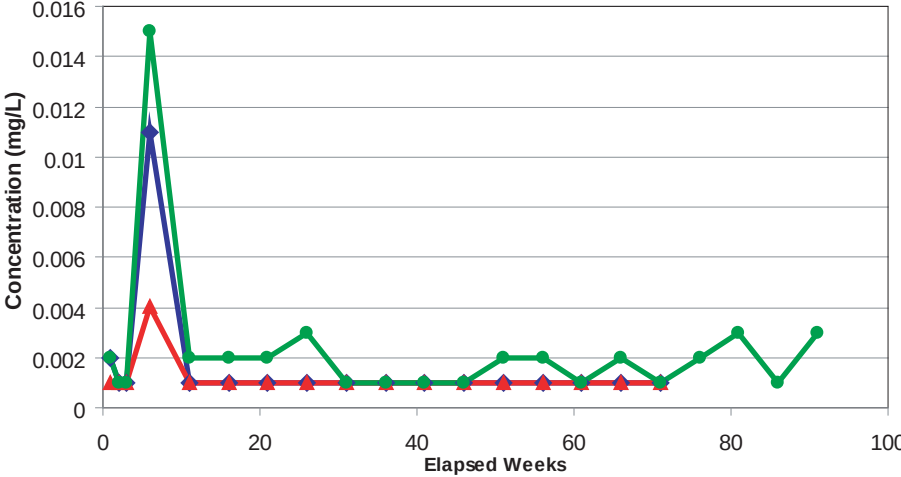
Uranium



Vanadium

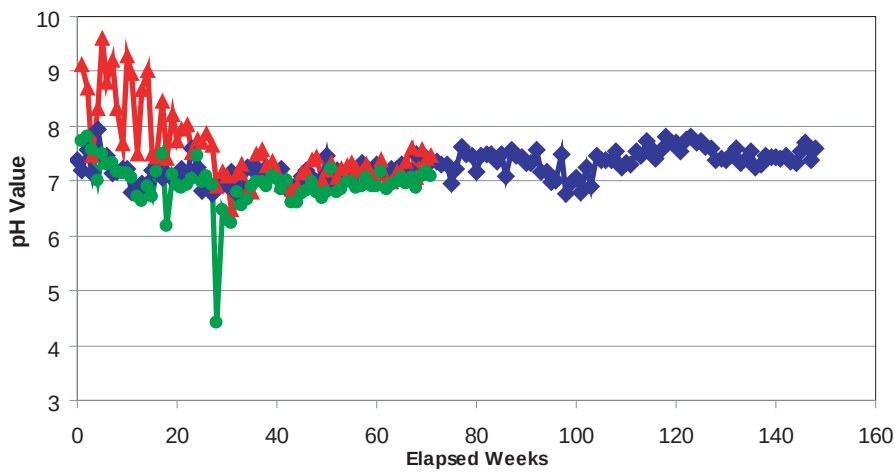


Zinc

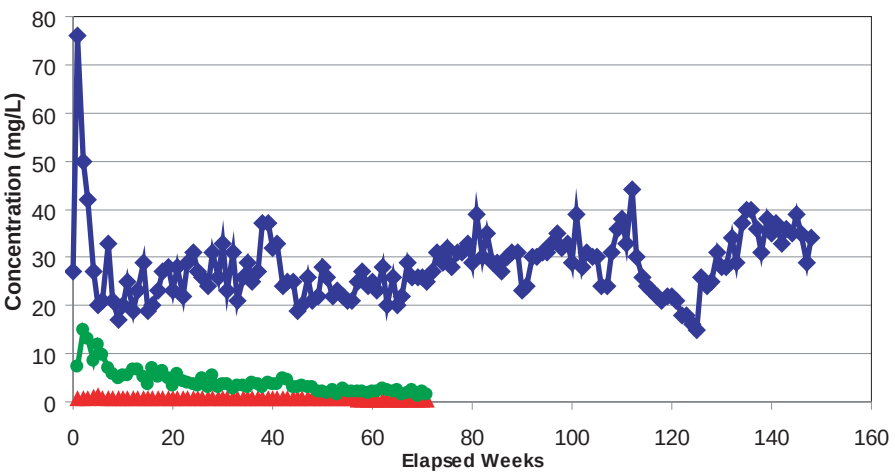


MAR07-16 ($S_T = 4.37\%$)
MAR07-18 ($S_T = 0.19\%$)
MAR07-99 ($S_T = 0.52\%$)

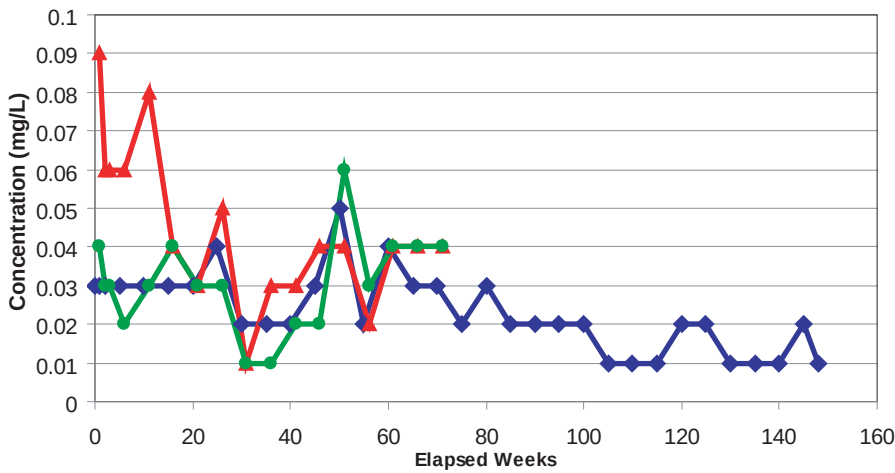
Leachate pH



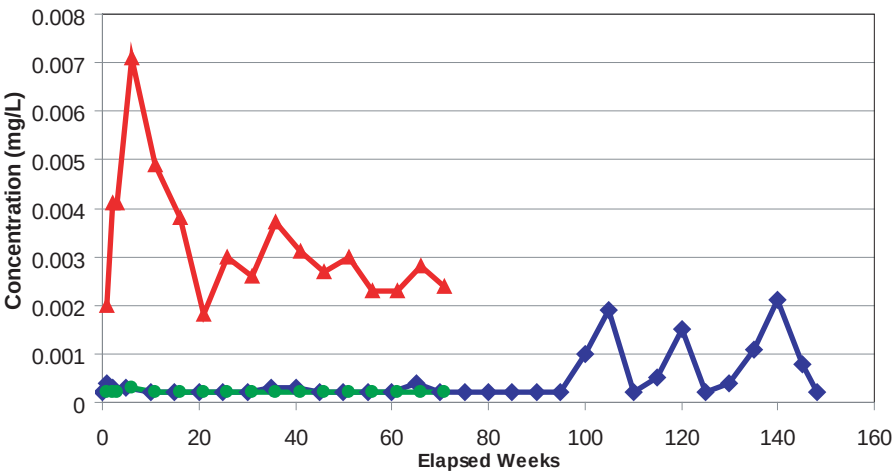
Sulphate



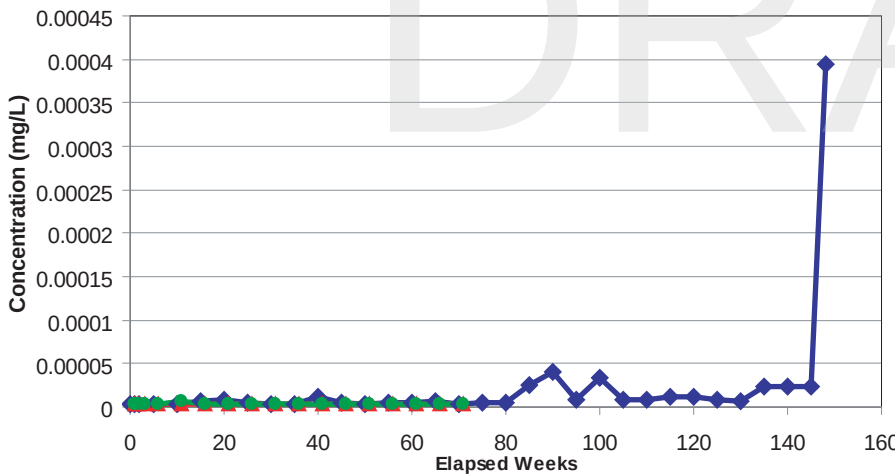
Aluminum



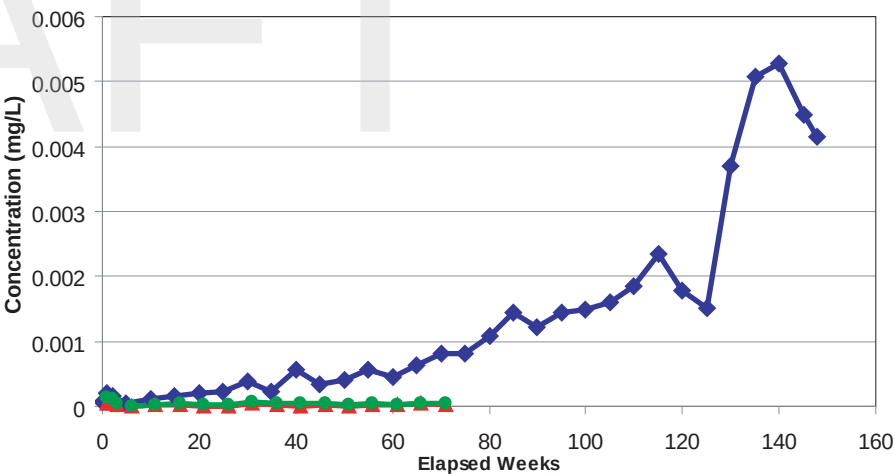
Arsenic



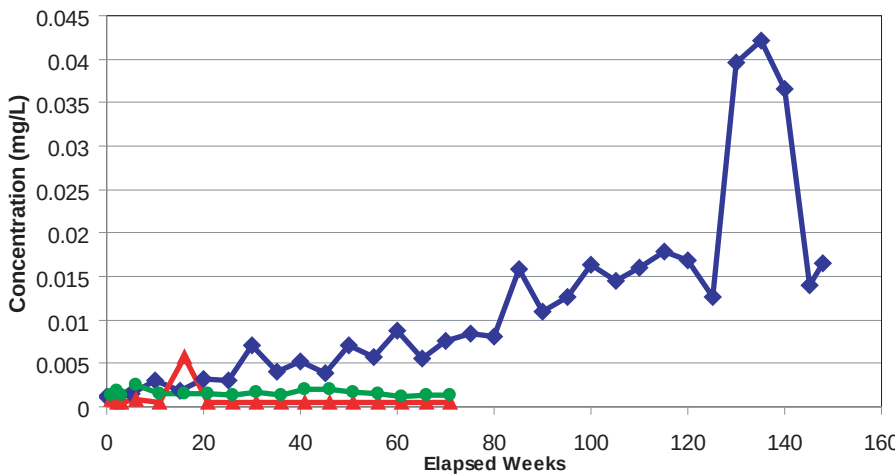
Cadmium



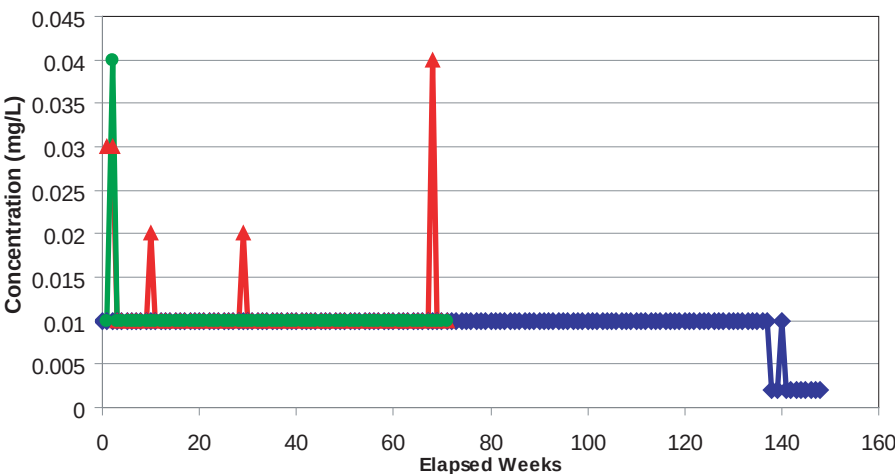
Cobalt



Copper

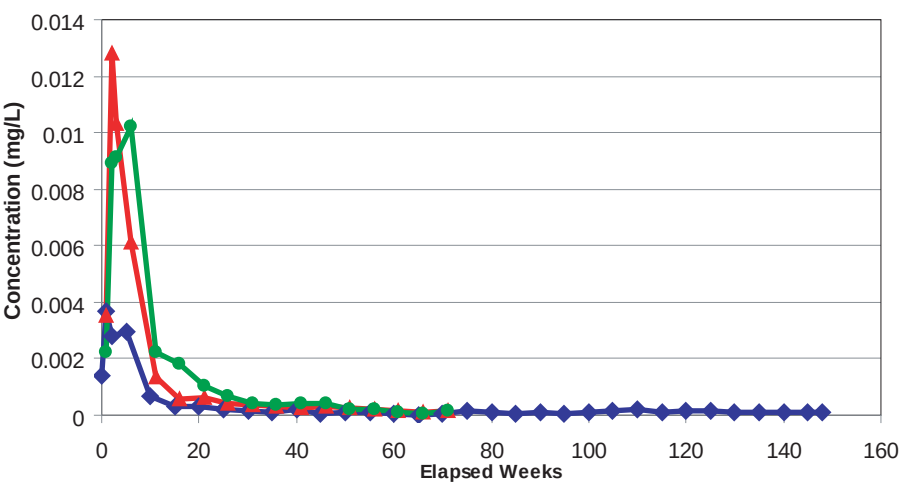


Iron

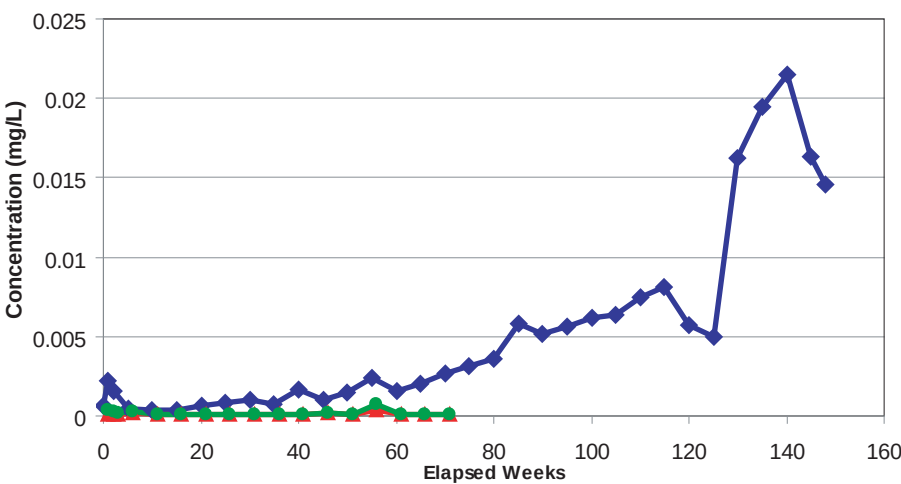


- MAR07-80 ($S_T = 0.34\%$)
- MAR07-15 ($S_T = 3.70\%$)
- MAR07-98 ($S_T = 0.011\%$)

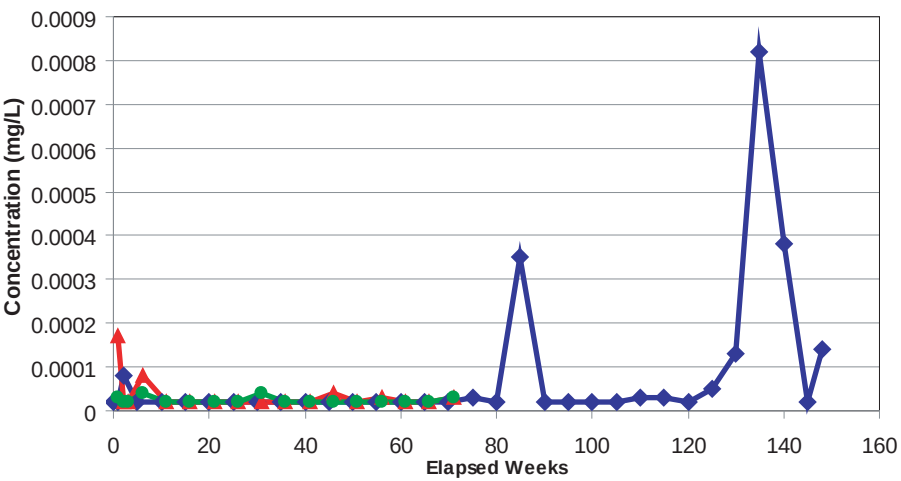
Molybdenum



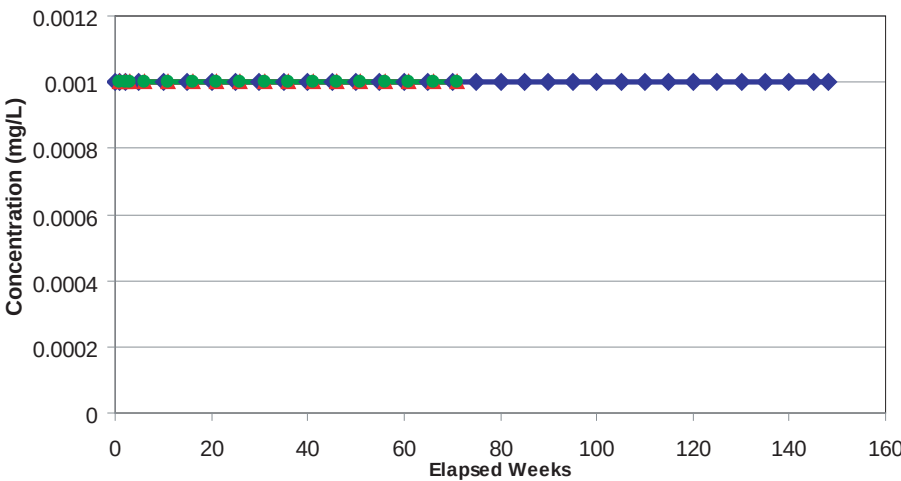
Nickel



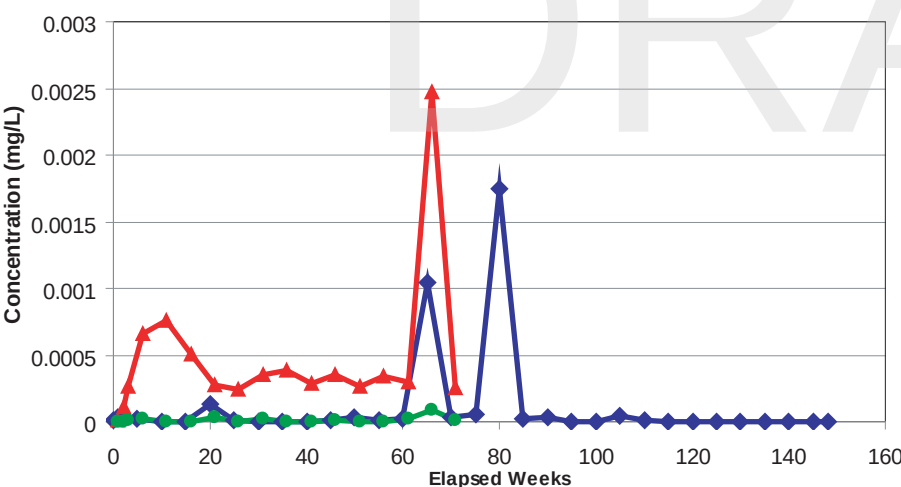
Lead



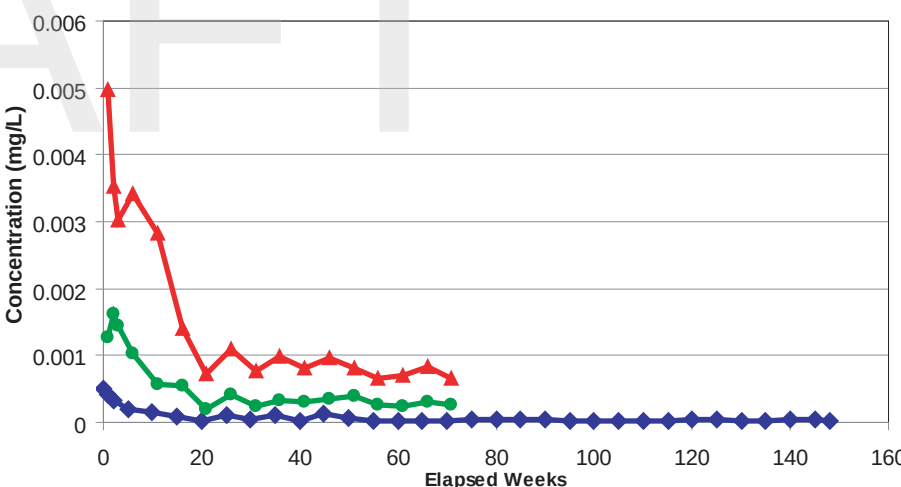
Selenium



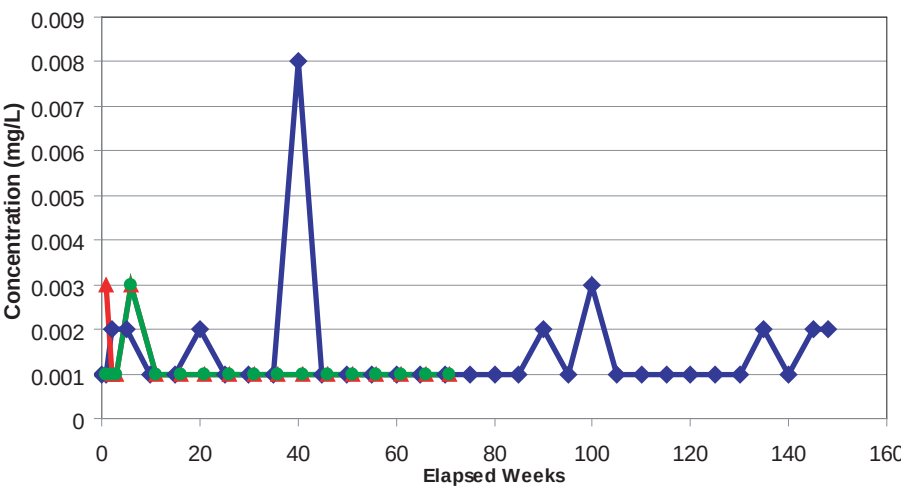
Uranium



Vanadium

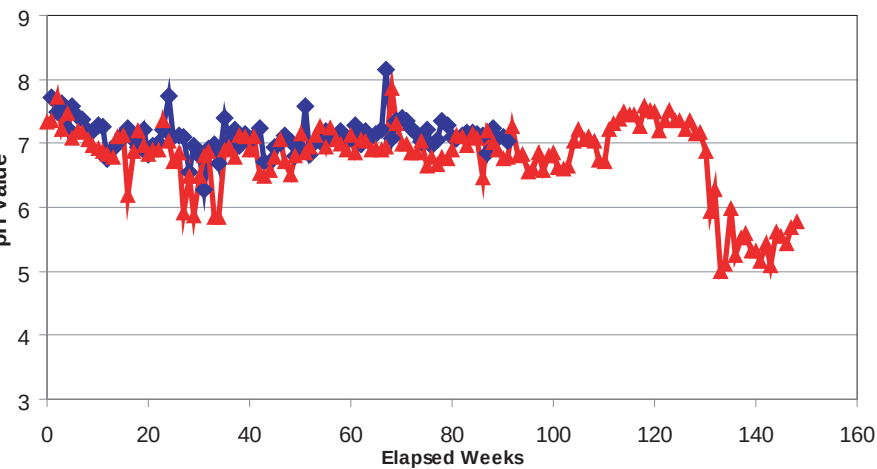


Zinc

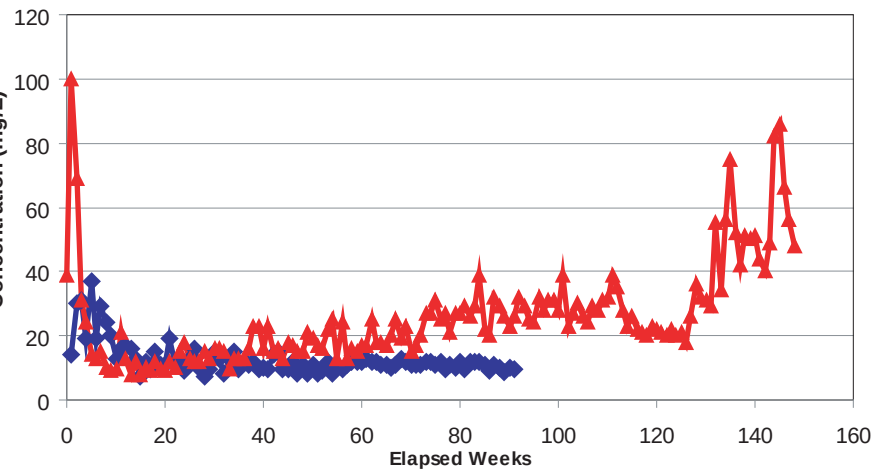


● MAR07-80 ($S_T = 0.34\%$)
◆ MAR07-15 ($S_T = 3.70\%$)
▲ MAR07-98 ($S_T = 0.011\%$)

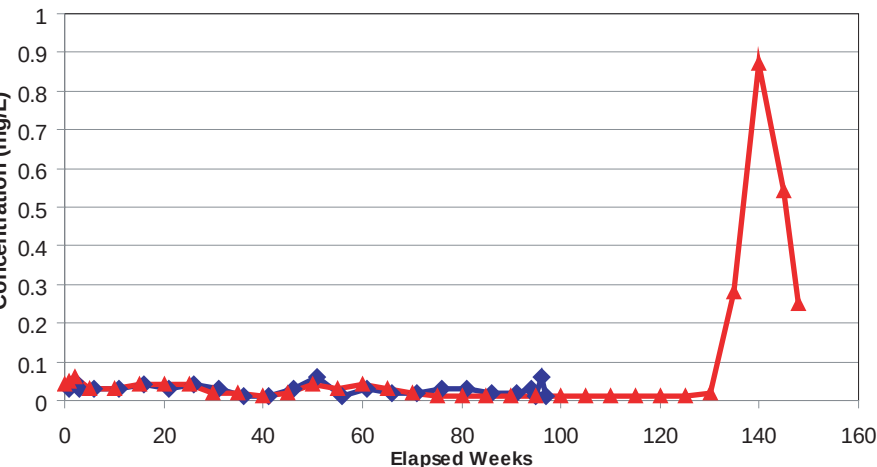
Leachate pH



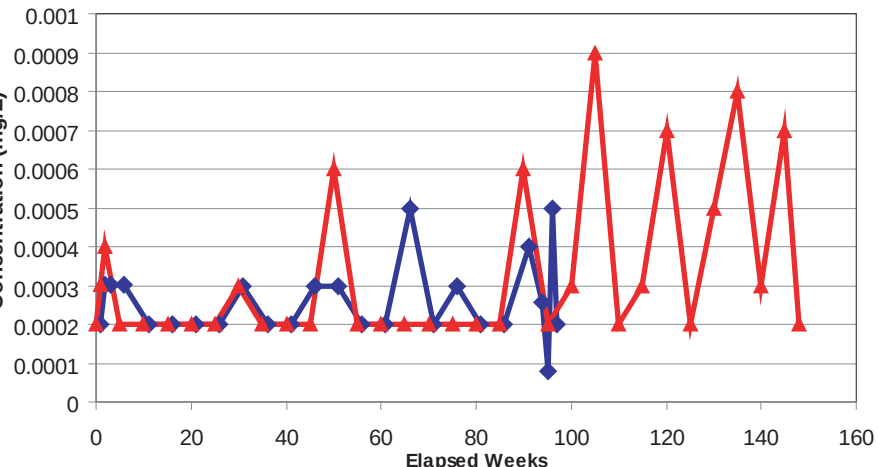
Sulphate



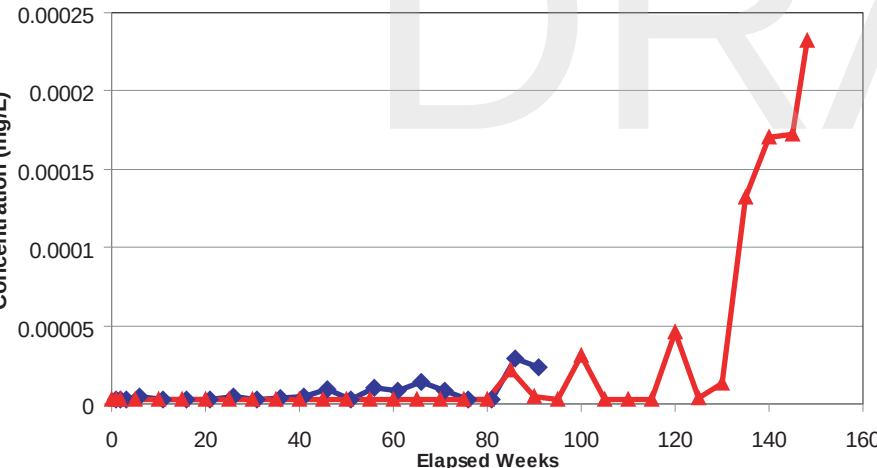
Aluminum



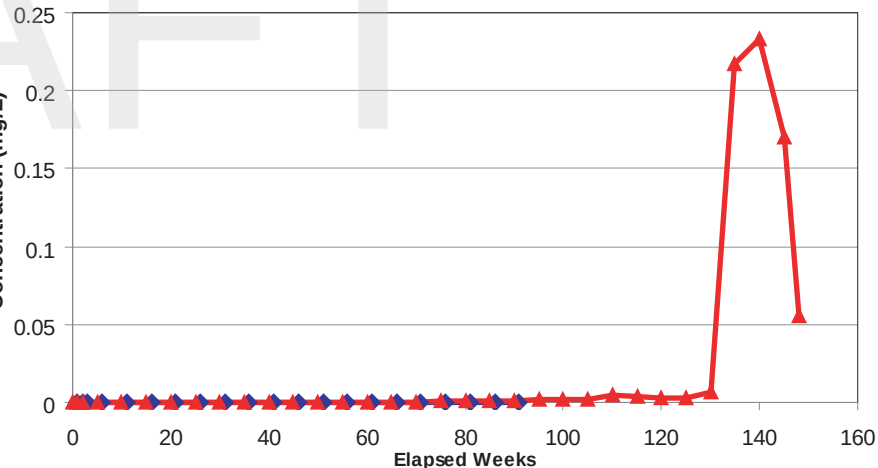
Arsenic



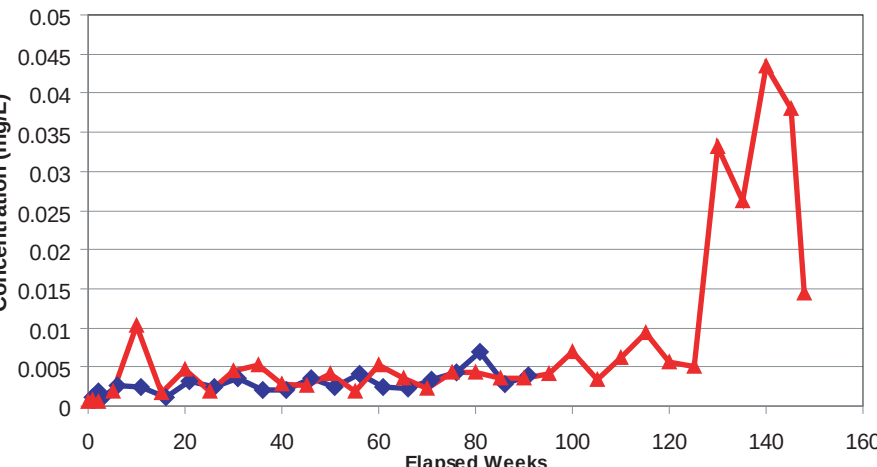
Cadmium



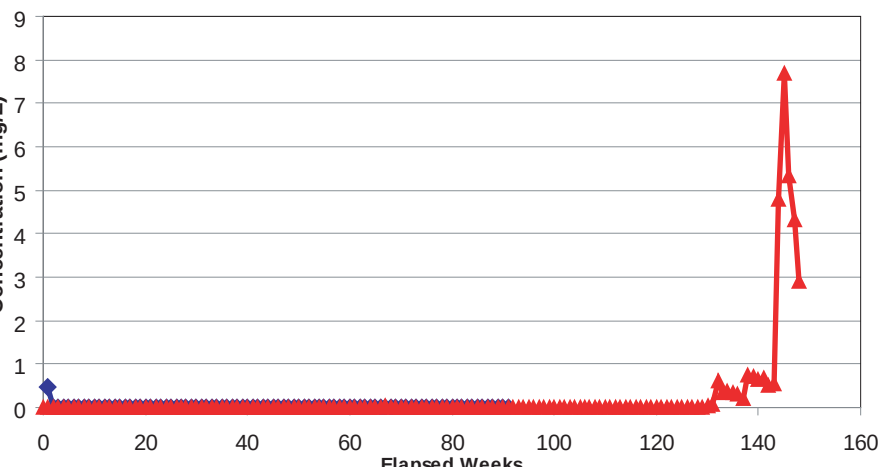
Cobalt



Copper

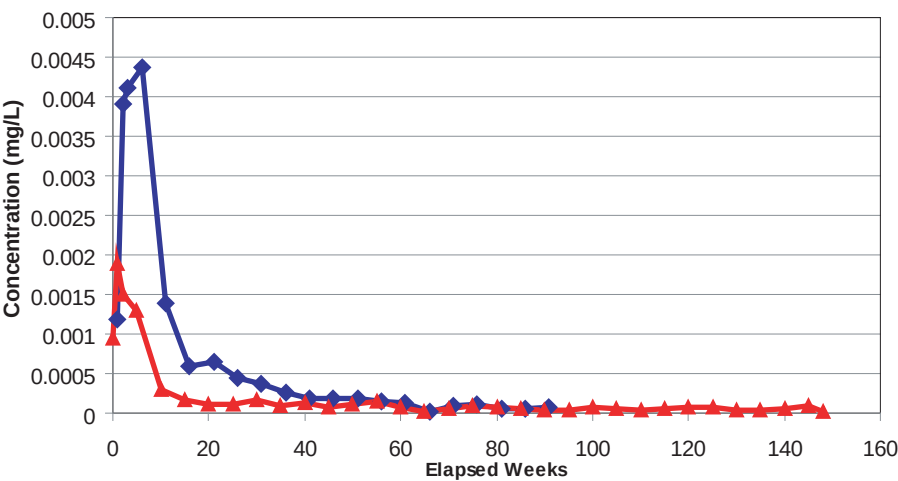


Iron

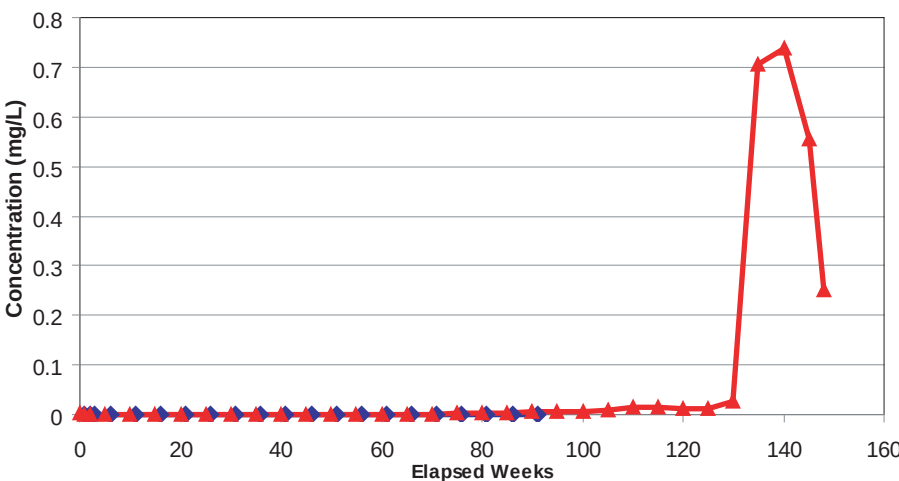


—◆— MAR07-33 (S_T = 2.0%)
—▲— MAR07-96 (S_T = 6.7%)

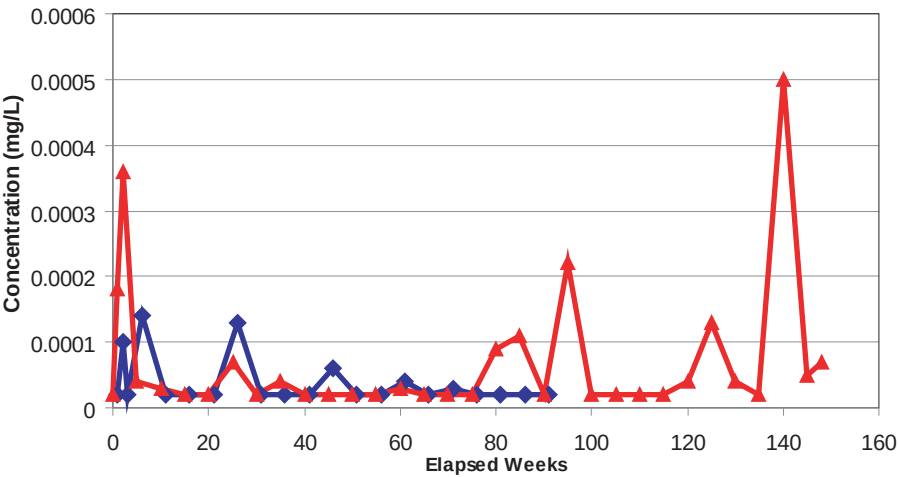
Molybdenum



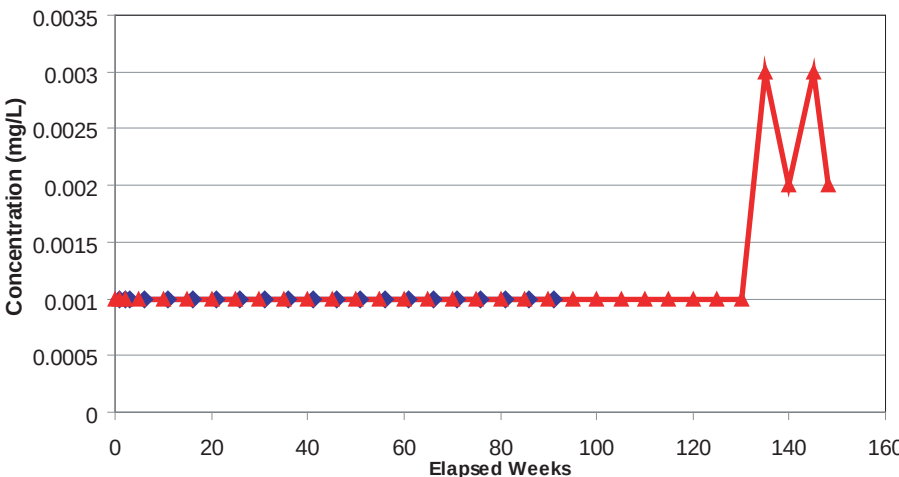
Nickel



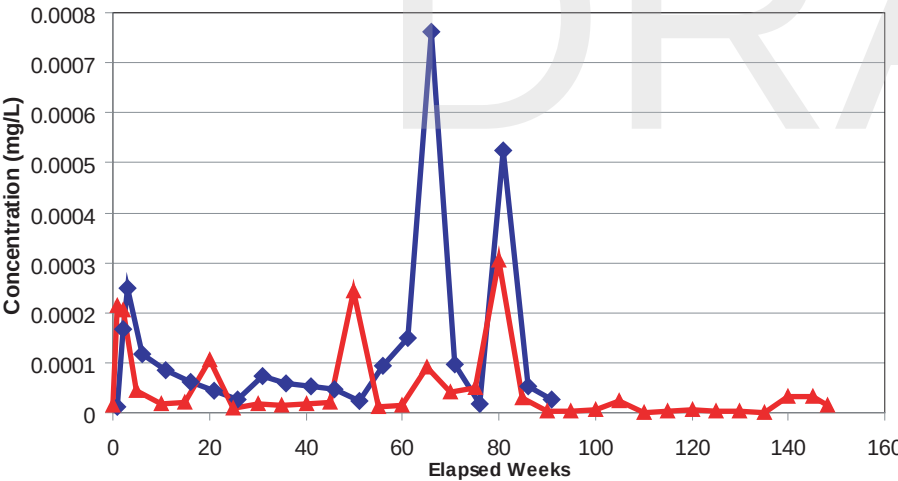
Lead



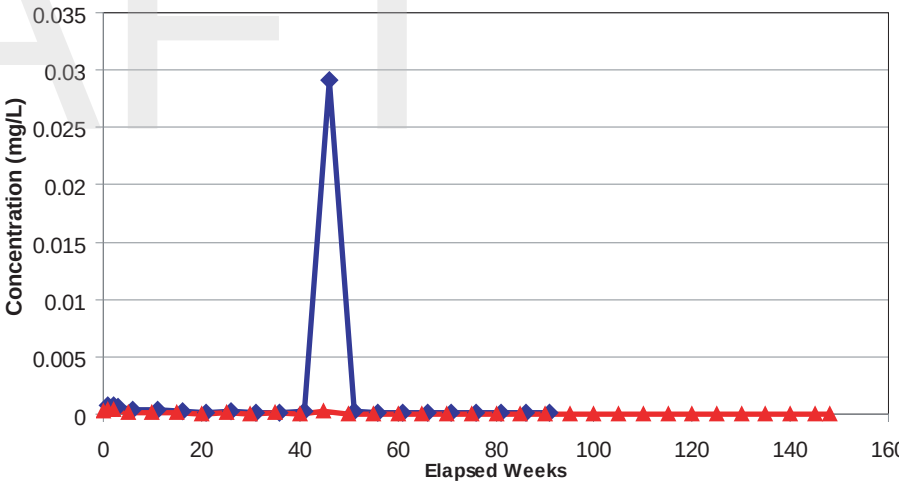
Selenium



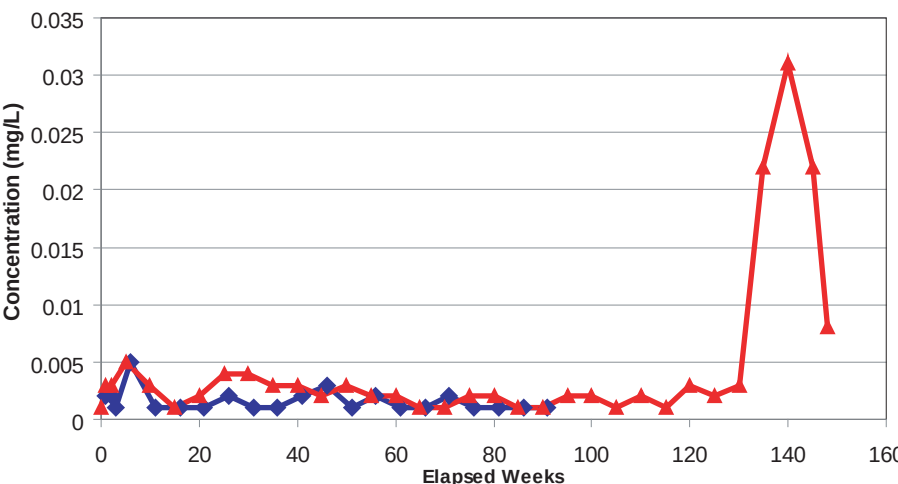
Uranium



Vanadium

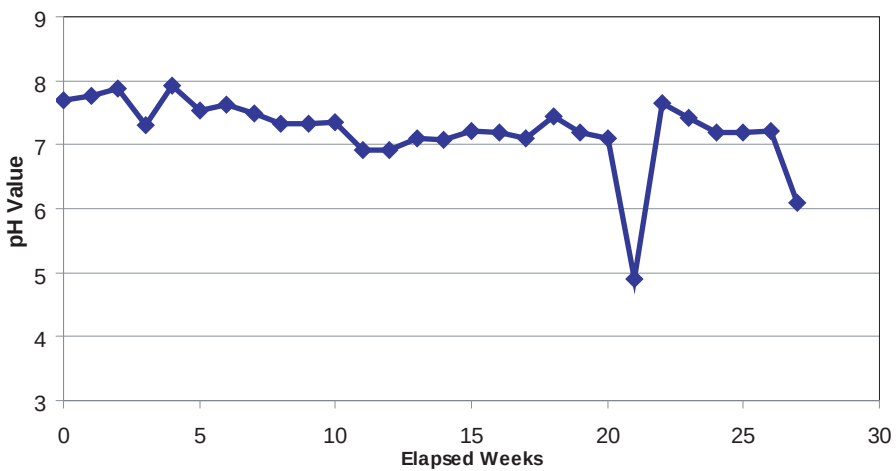


Zinc

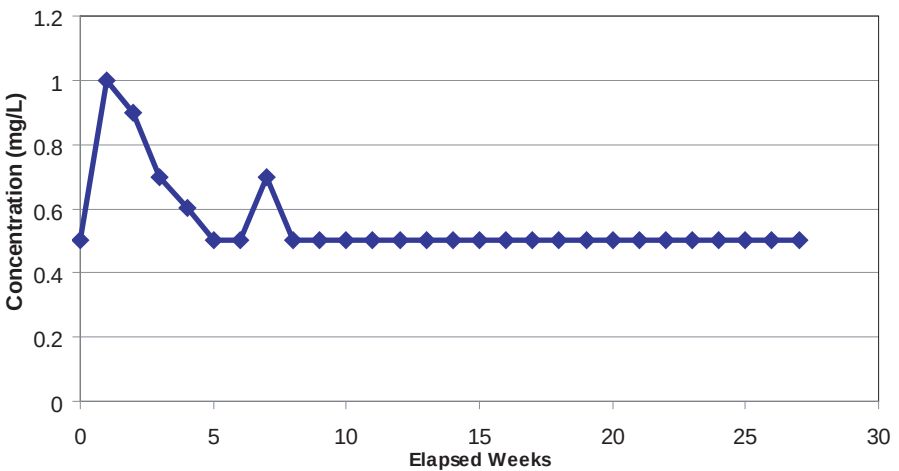


◆ MAR07-33 ($S_T = 2.0\%$)
 ▲ MAR07-96 ($S_T = 6.7\%$)

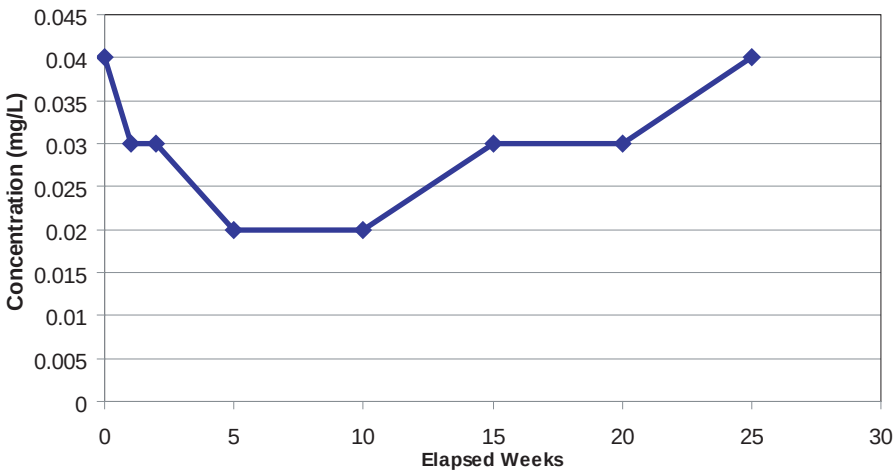
Leachate pH



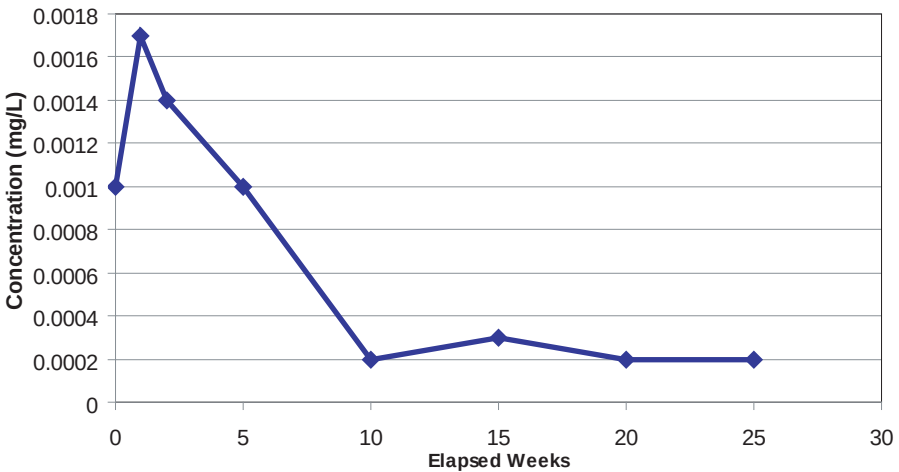
Sulphate



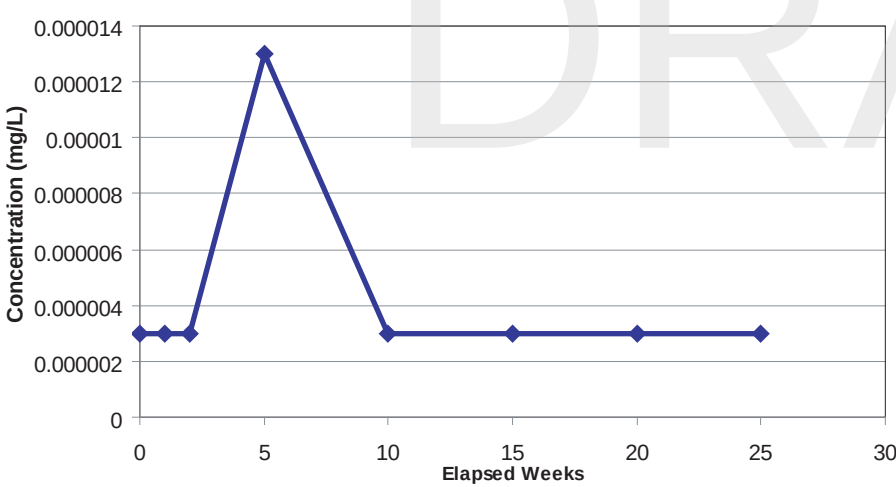
Aluminum



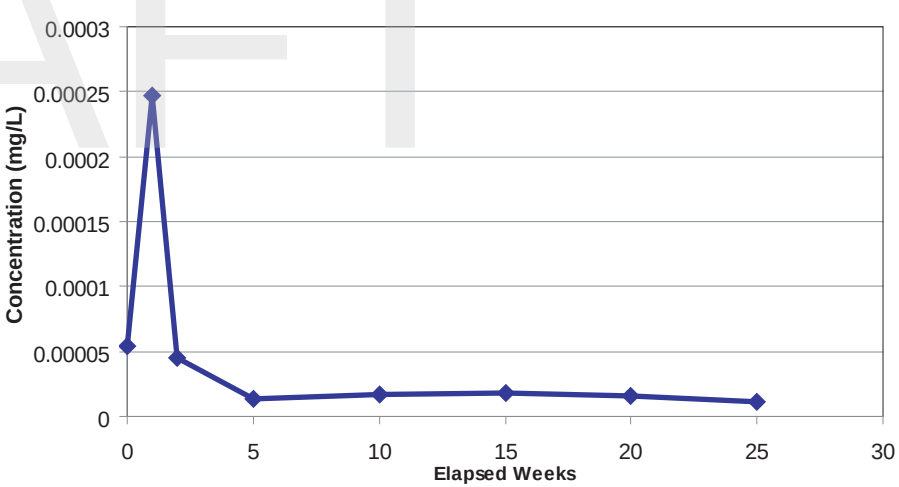
Arsenic



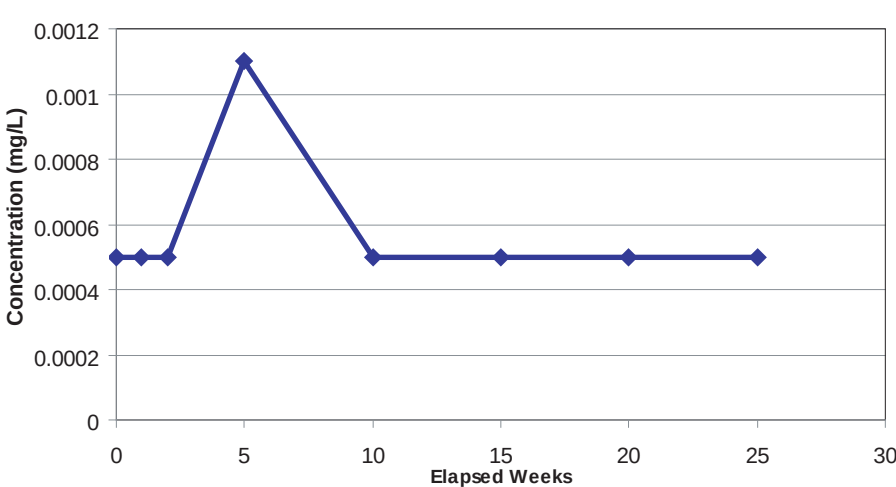
Cadmium



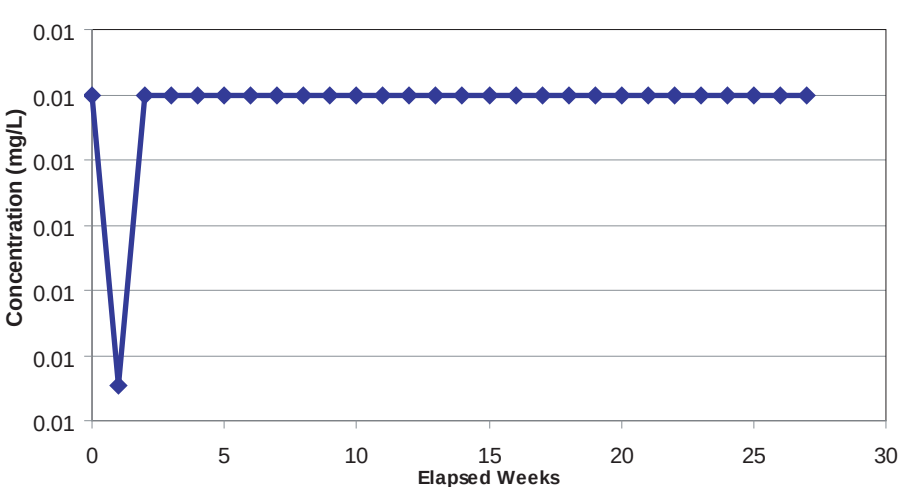
Cobalt



Copper

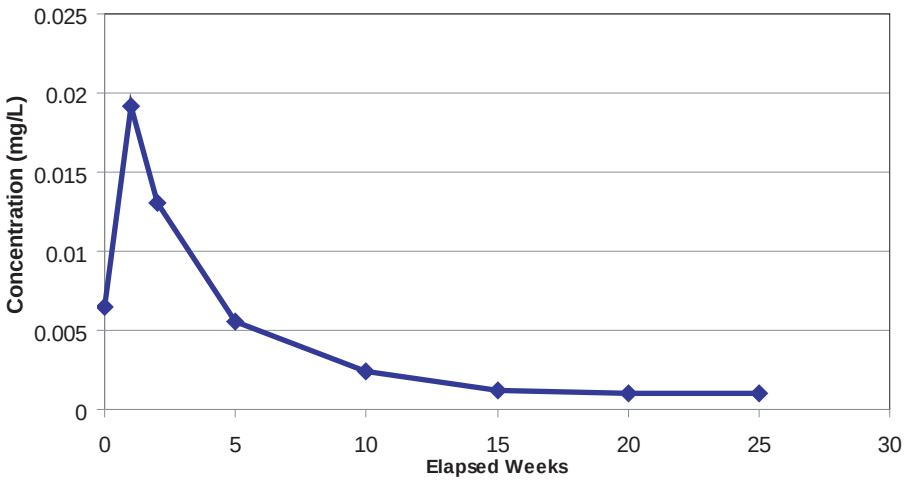


Iron

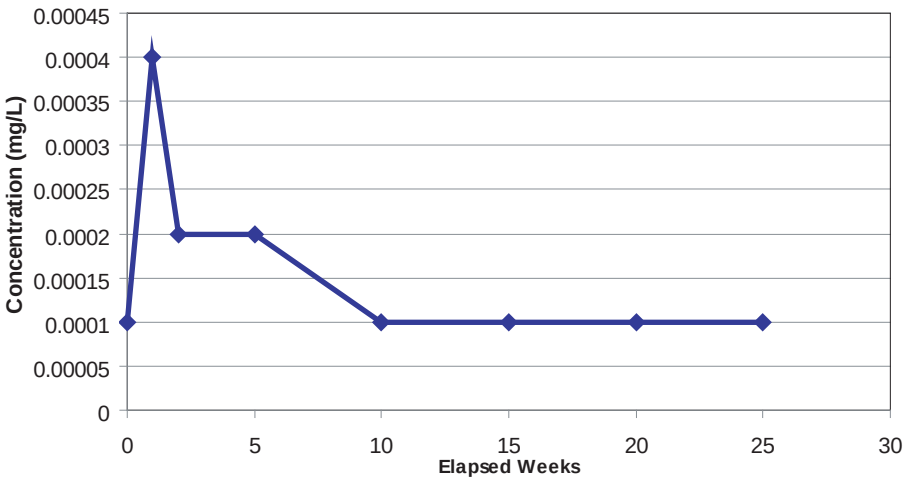


◆ MAR07-92 ($S_T = 0.005\%$)

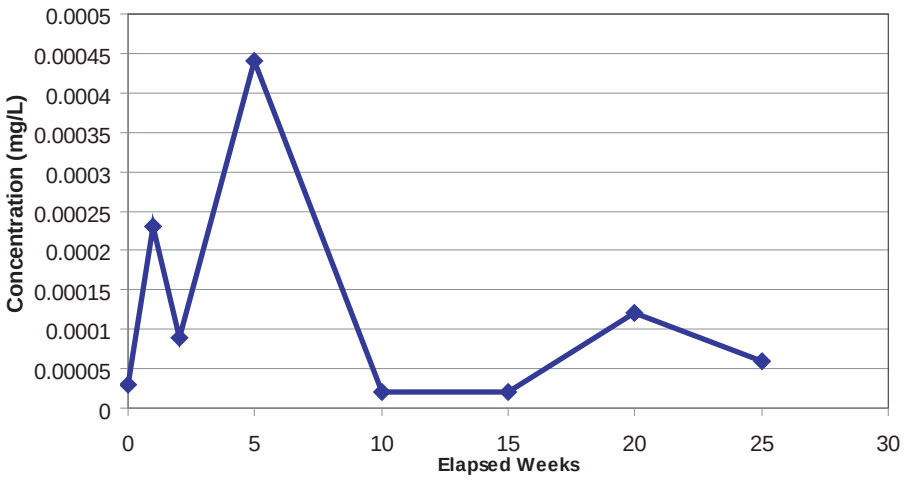
Molybdenum



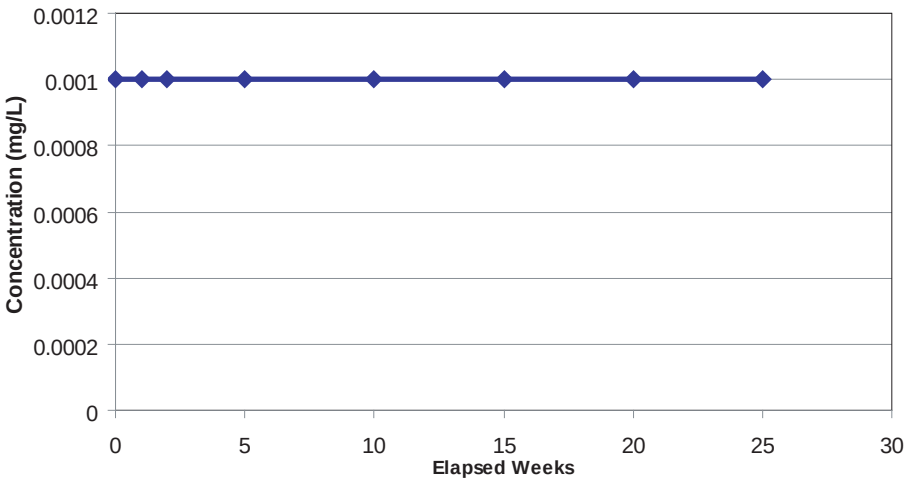
Nickel



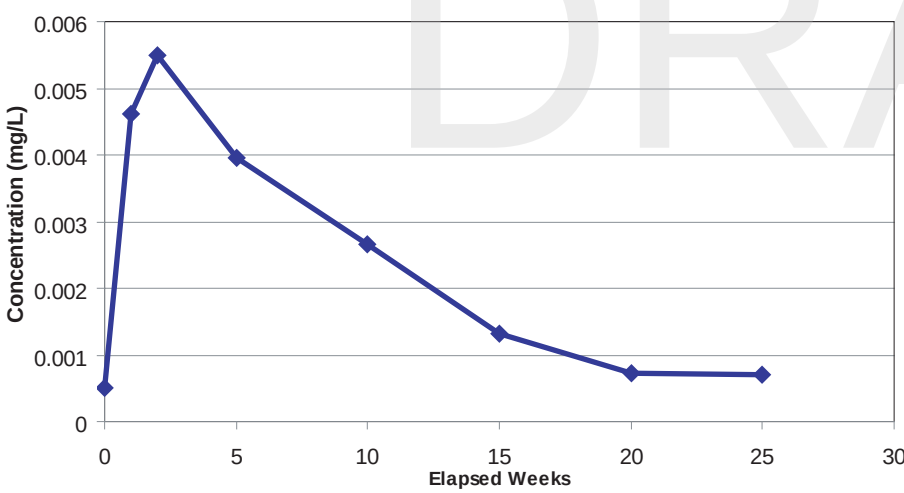
Lead



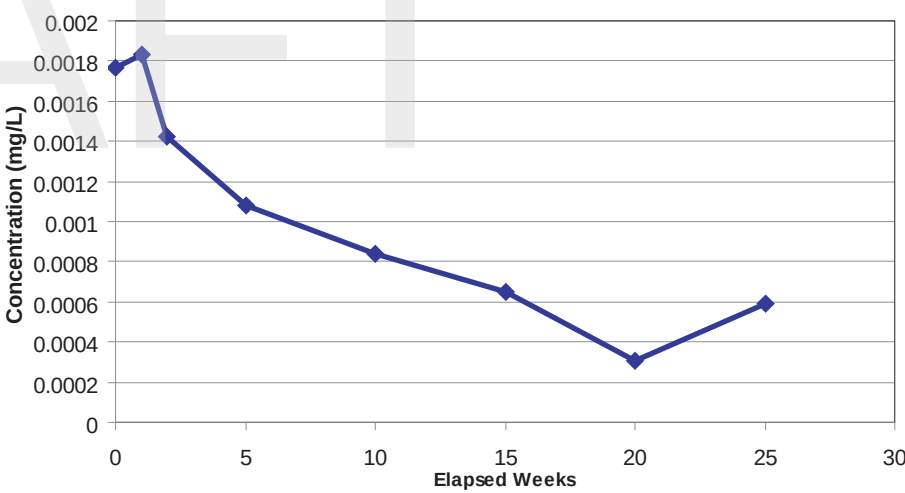
Selenium



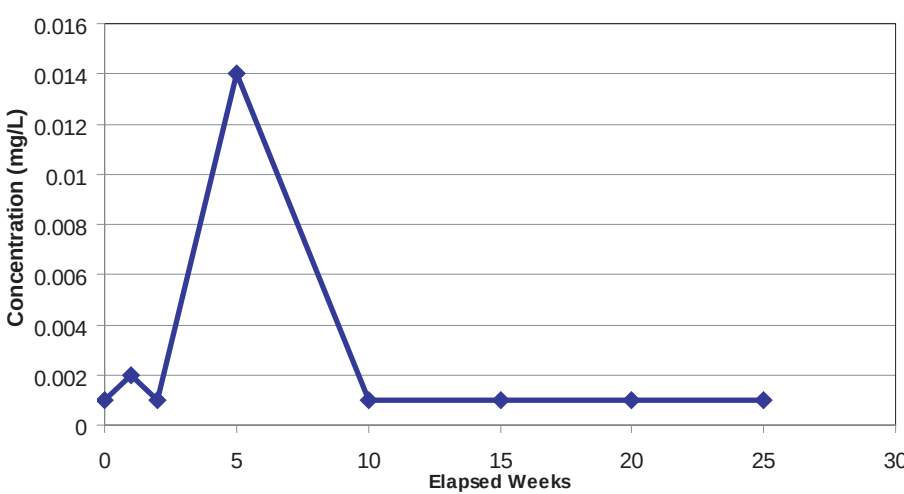
Uranium



Vanadium

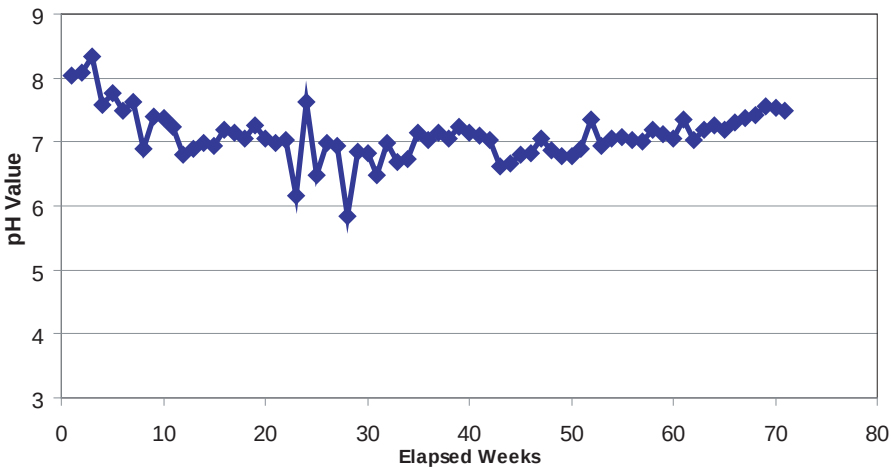


Zinc

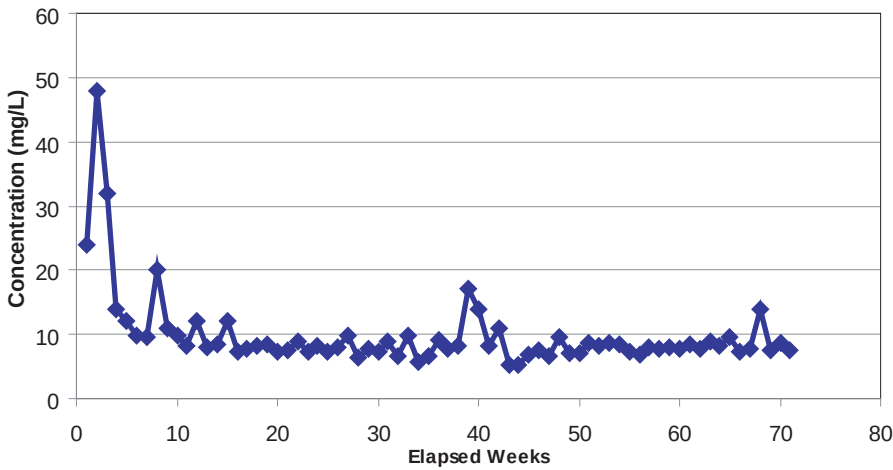


◆ MAR07-92 ($S_T = 0.005\%$)

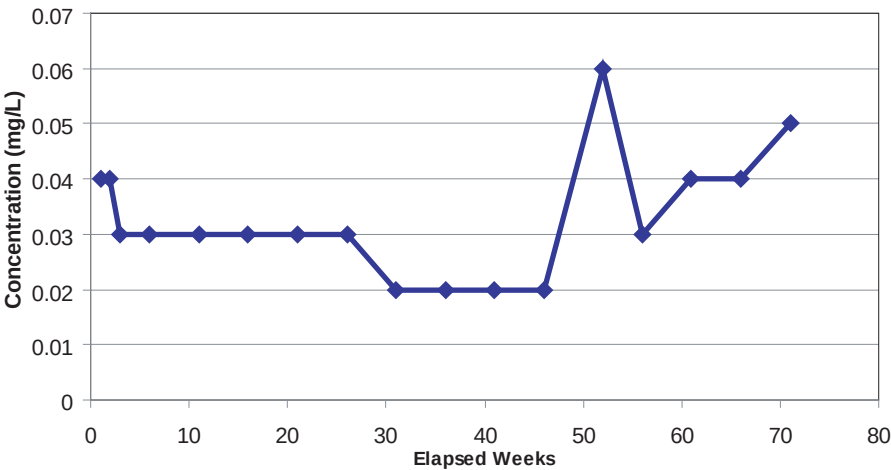
Leachate pH



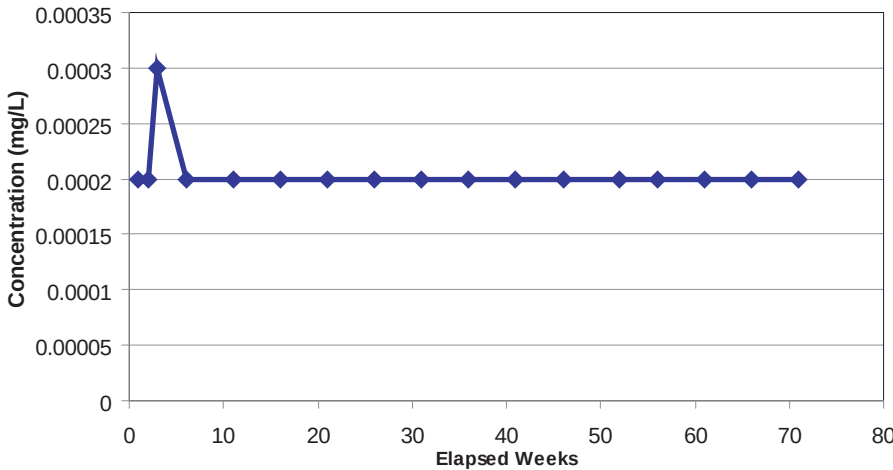
Sulphate



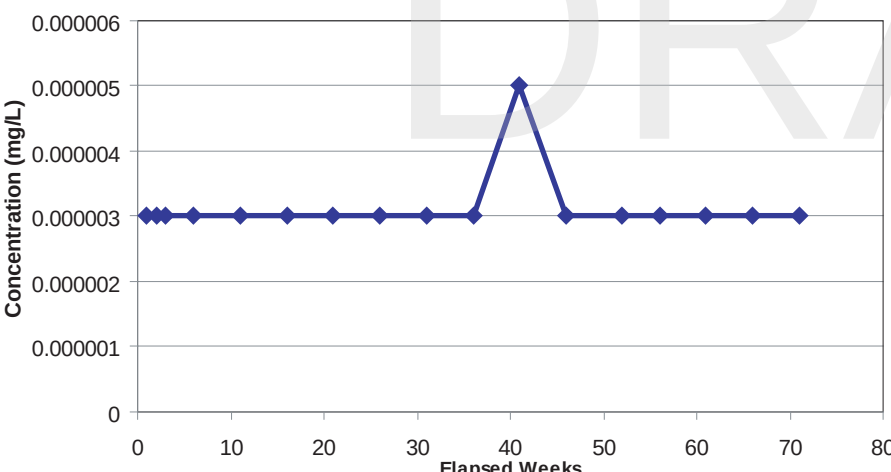
Aluminum



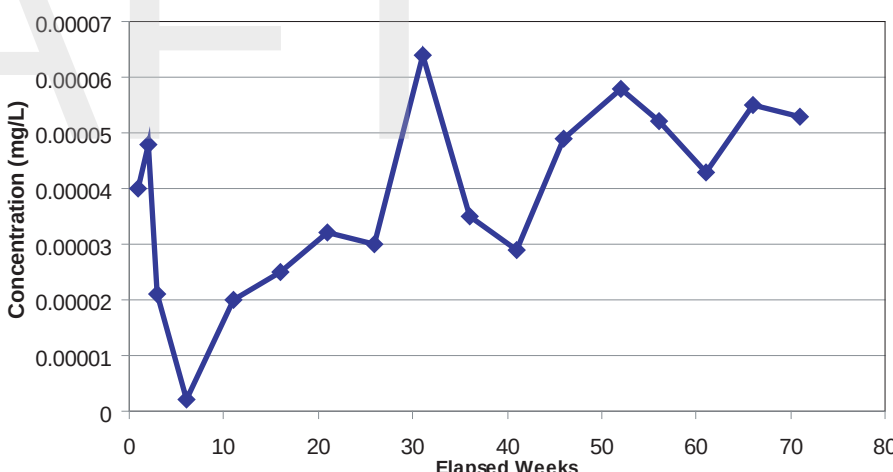
Arsenic



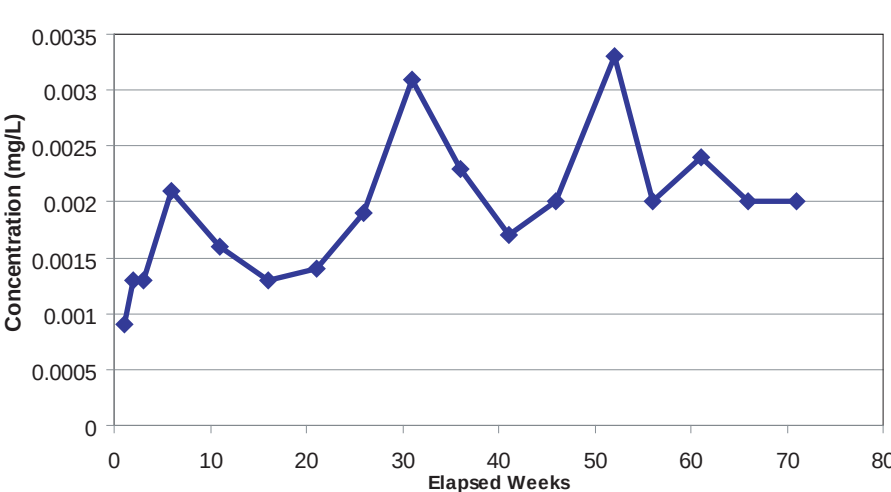
Cadmium



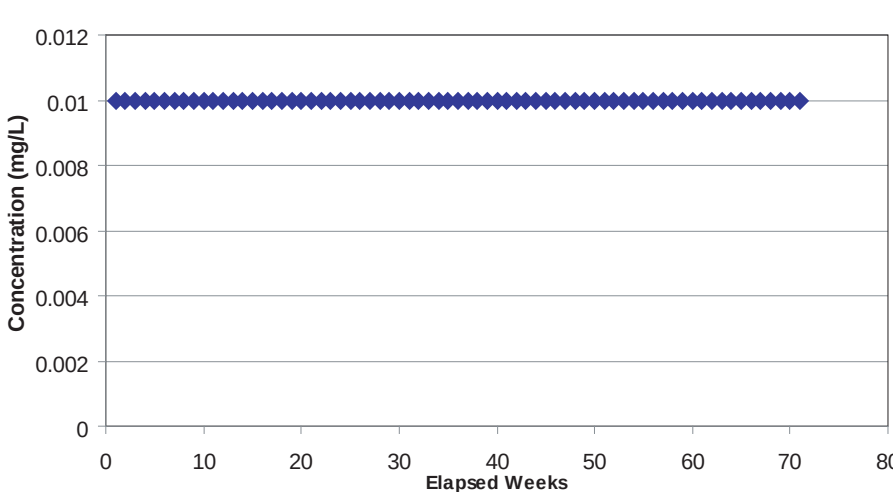
Cobalt



Copper

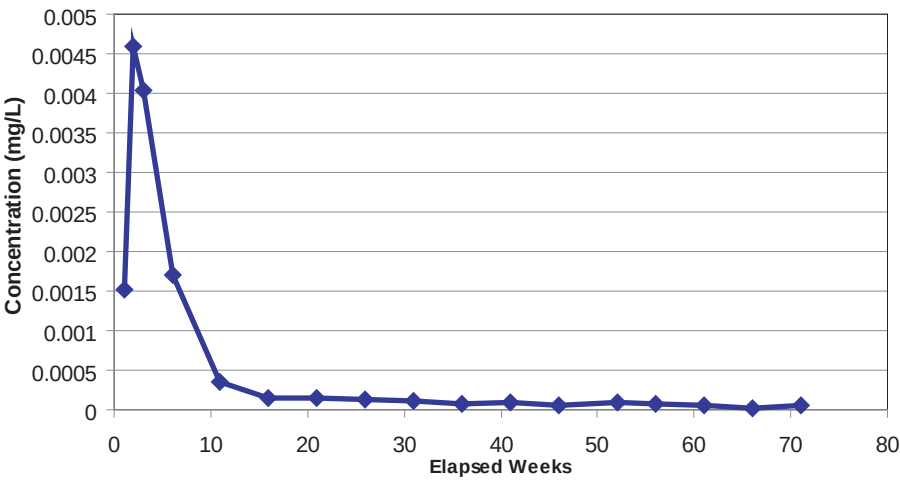


Iron

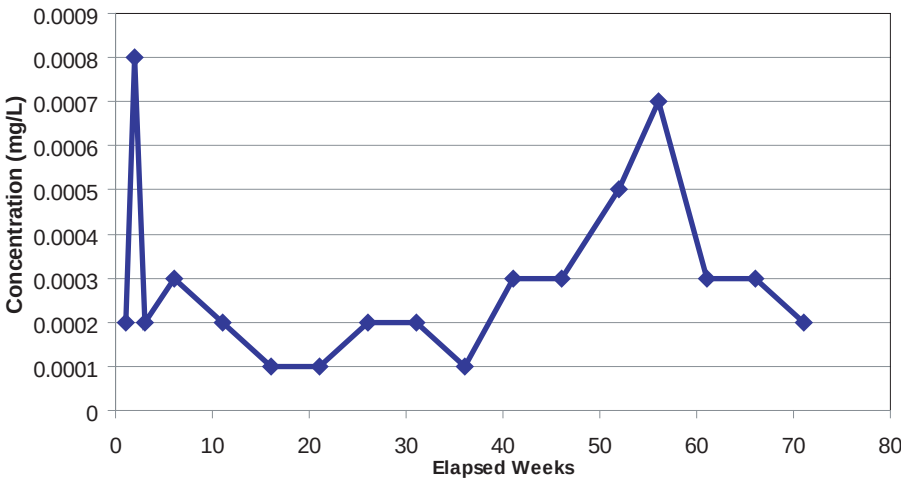


—◆— MAR07-49 (S_T = 0.99%)

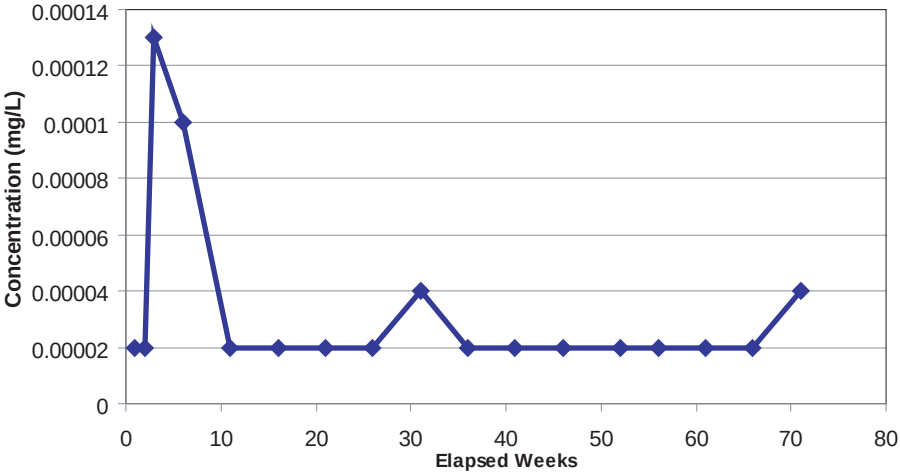
Molybdenum



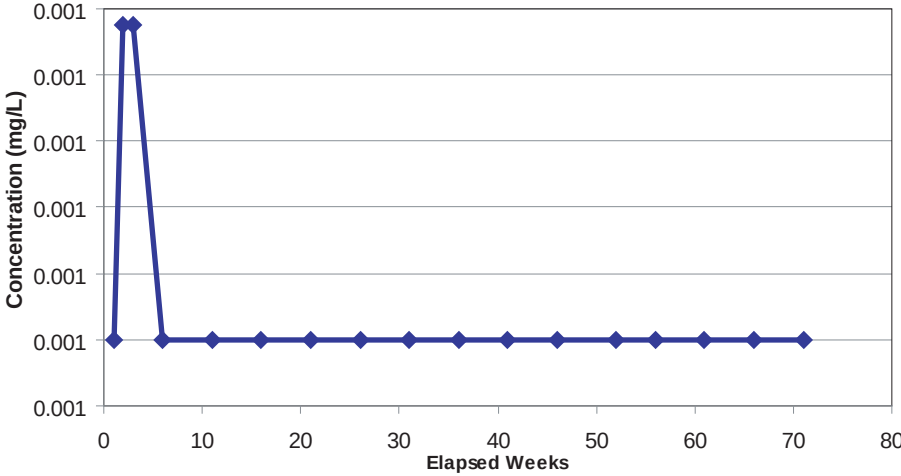
Nickel



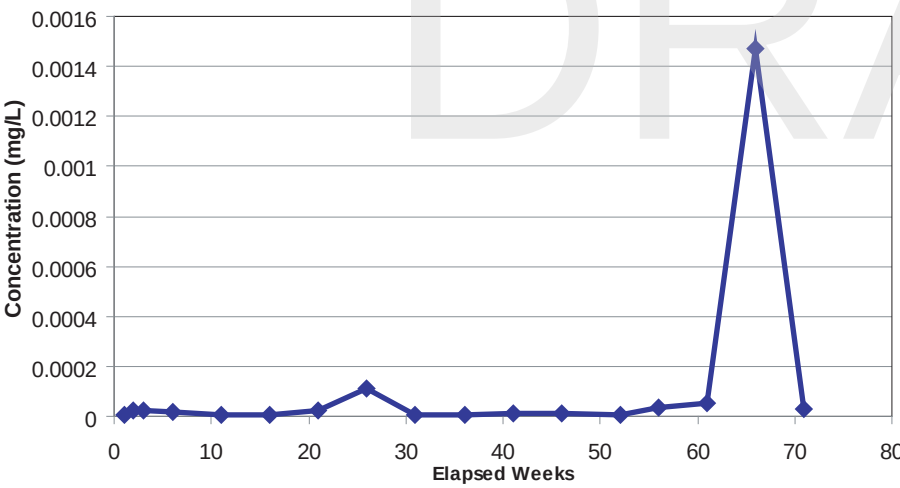
Lead



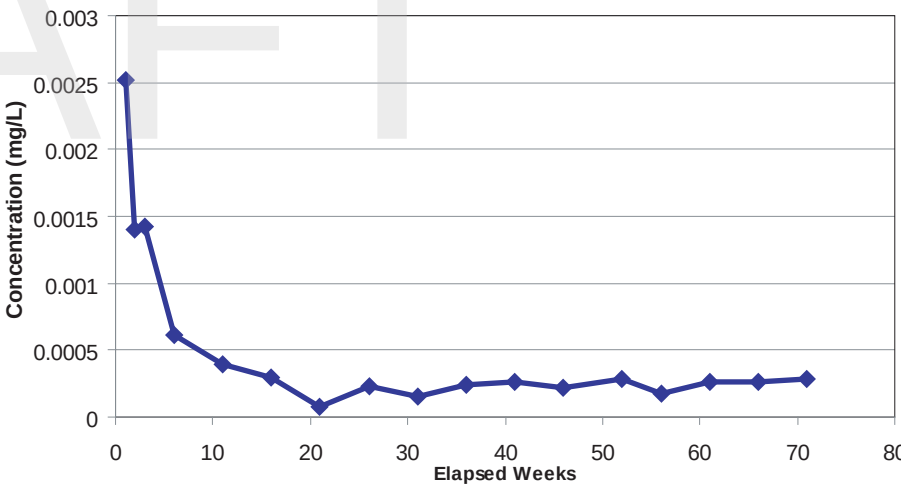
Selenium



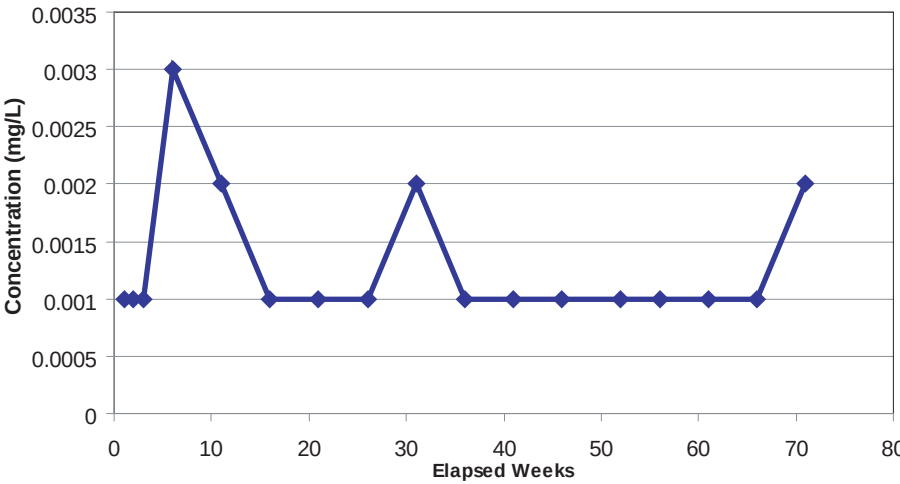
Uranium



Vanadium

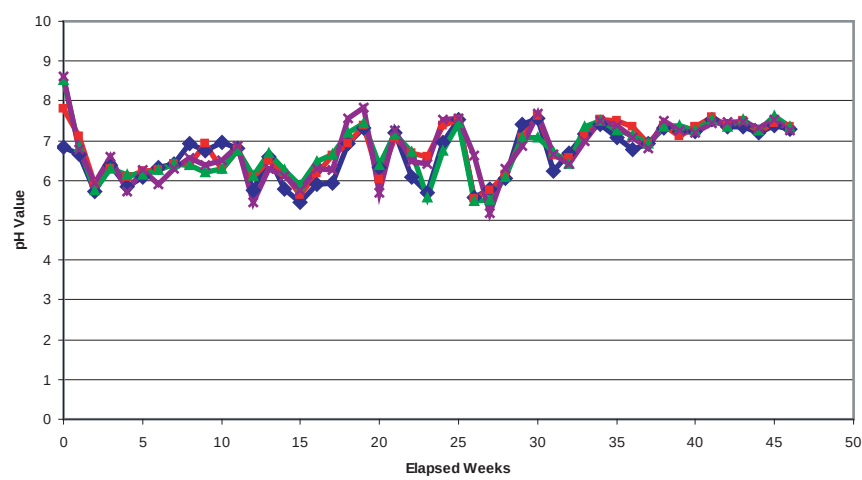


Zinc

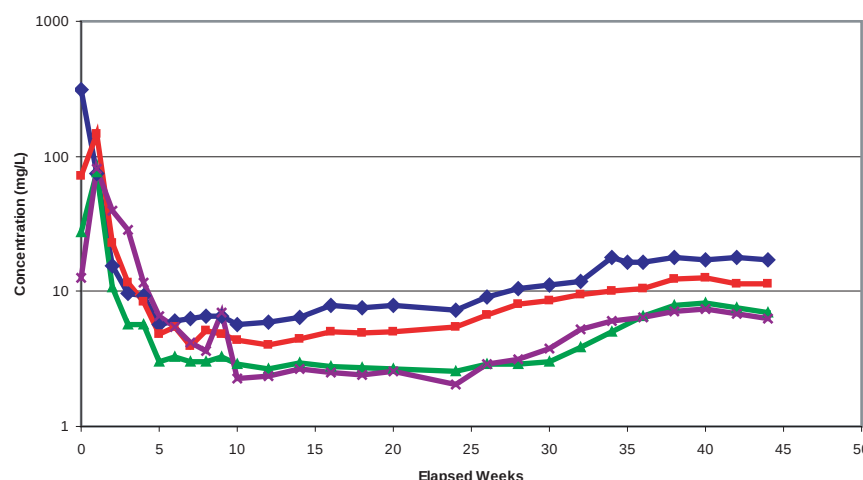


—◆— MAR07-49 (S_T= 0.99%)

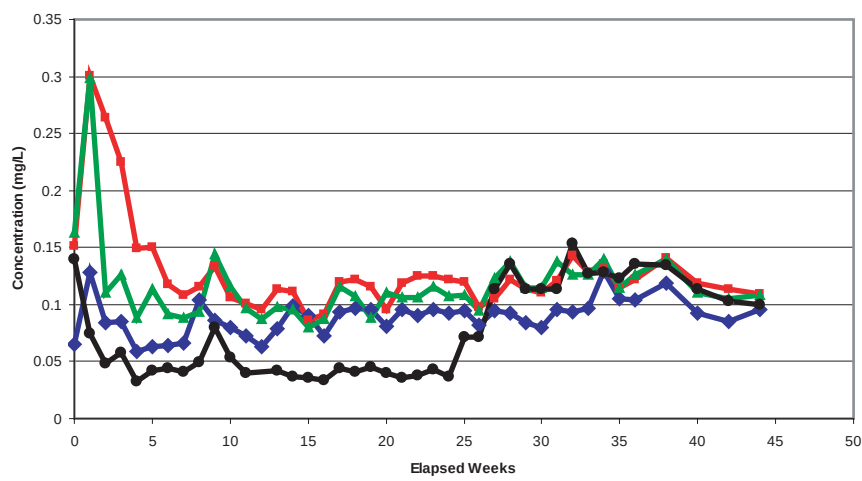
Leachate pH



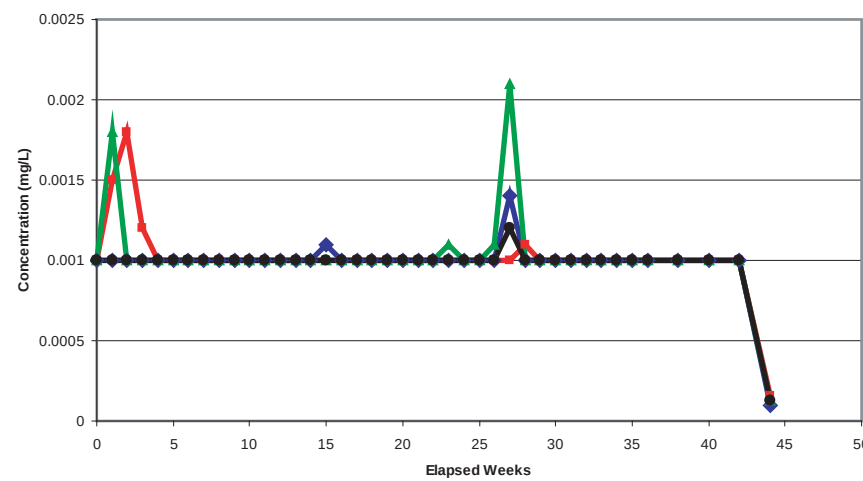
Sulphate



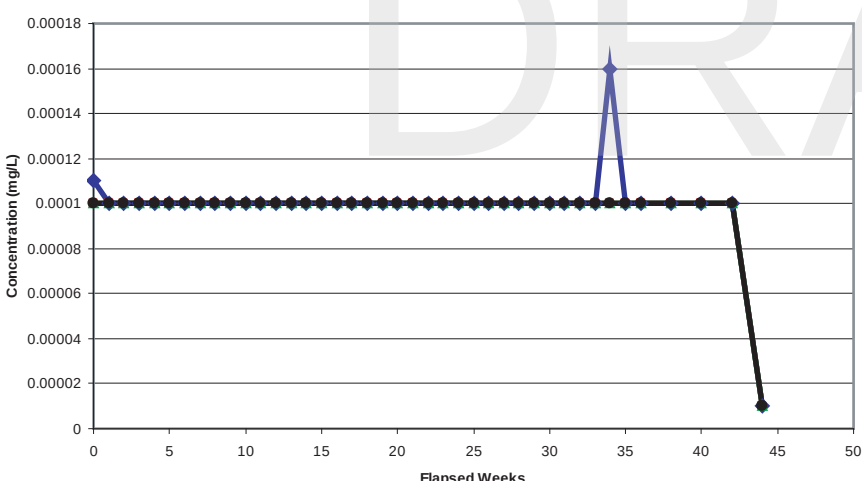
Aluminum



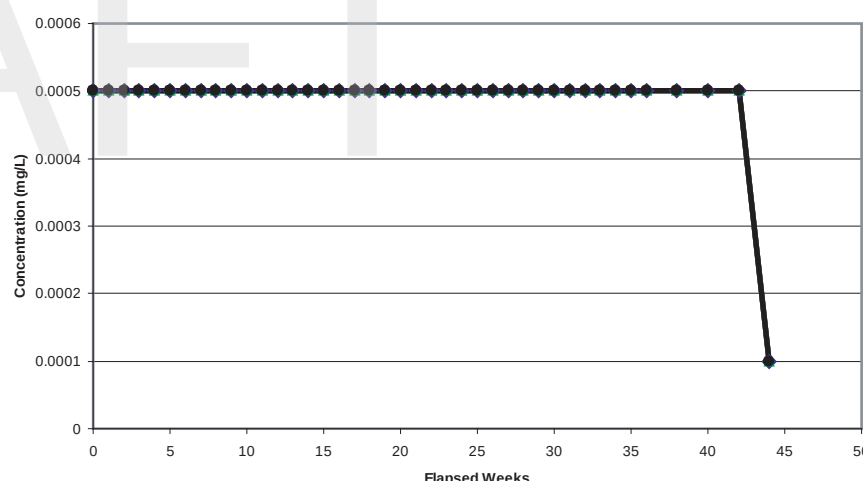
Arsenic



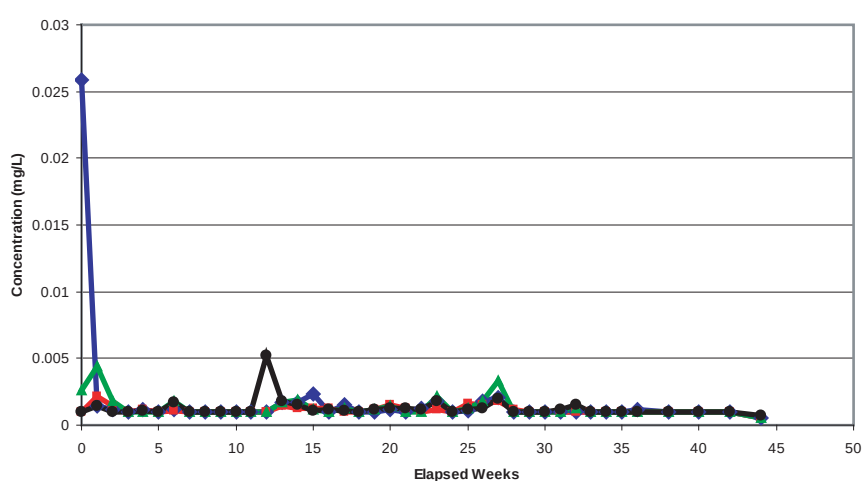
Cadmium



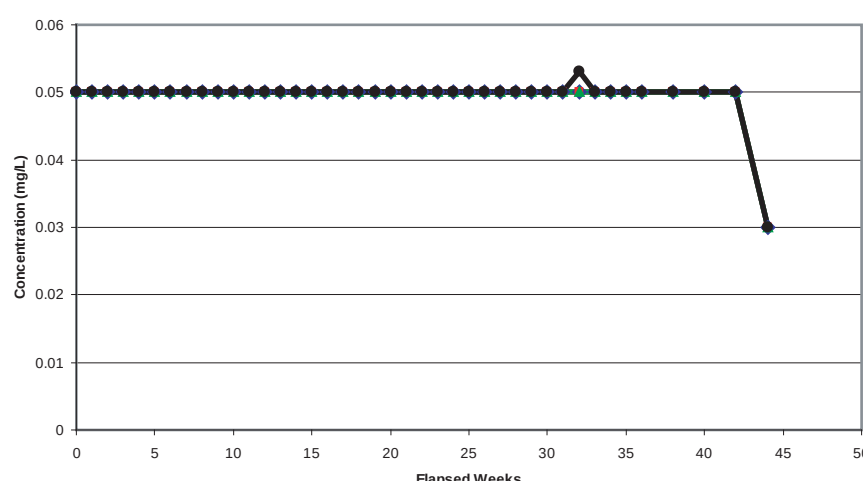
Cobalt



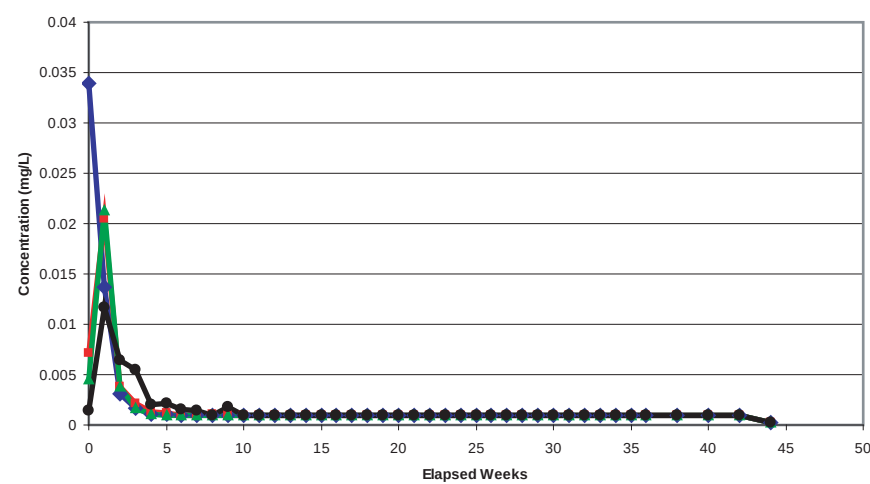
Copper



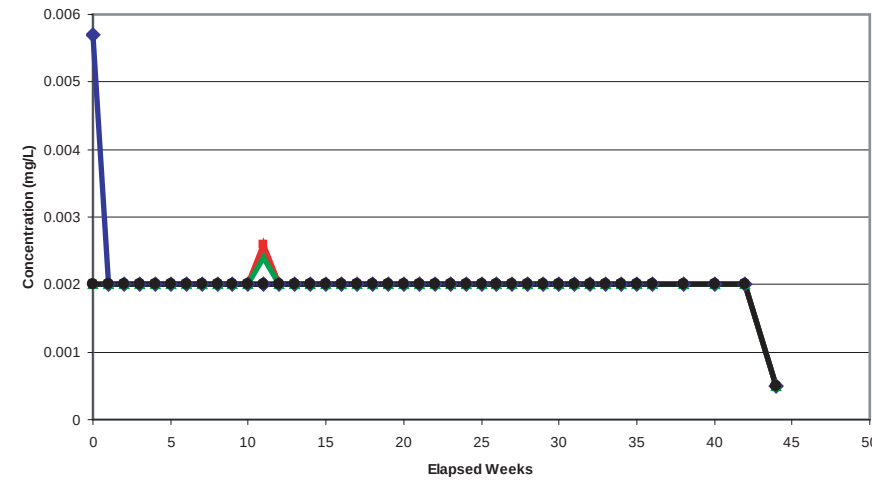
Iron



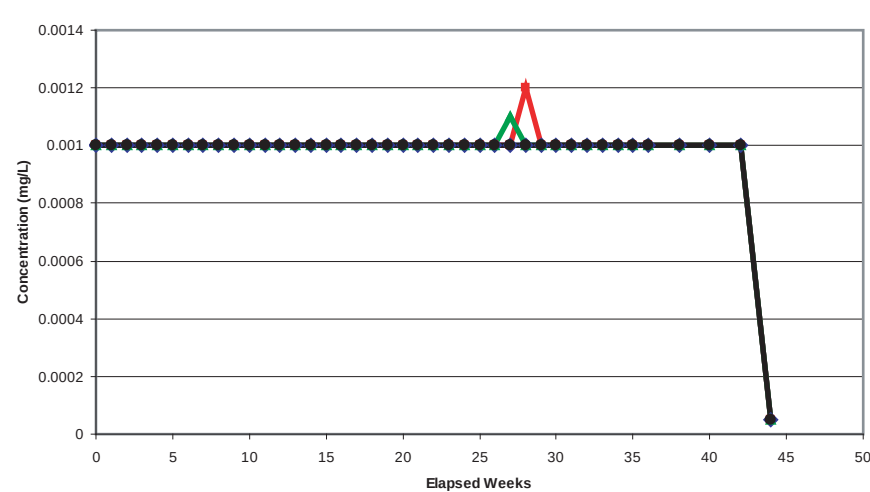
Molybdenum



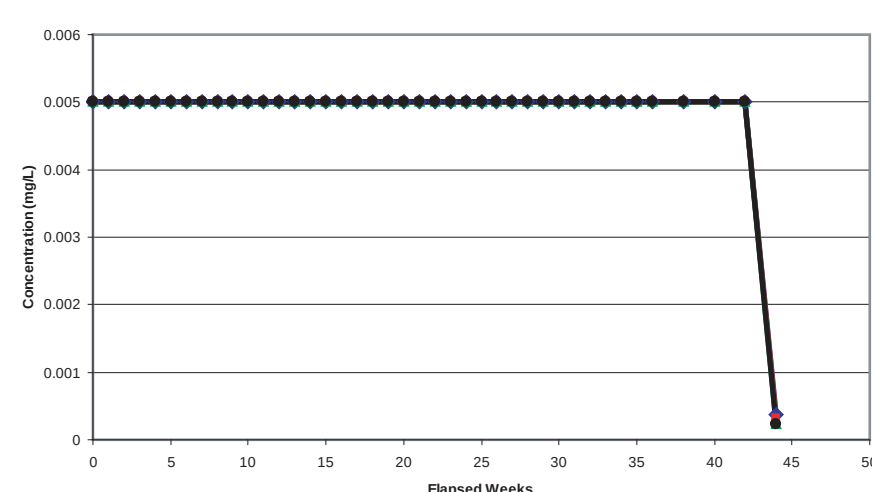
Nickel



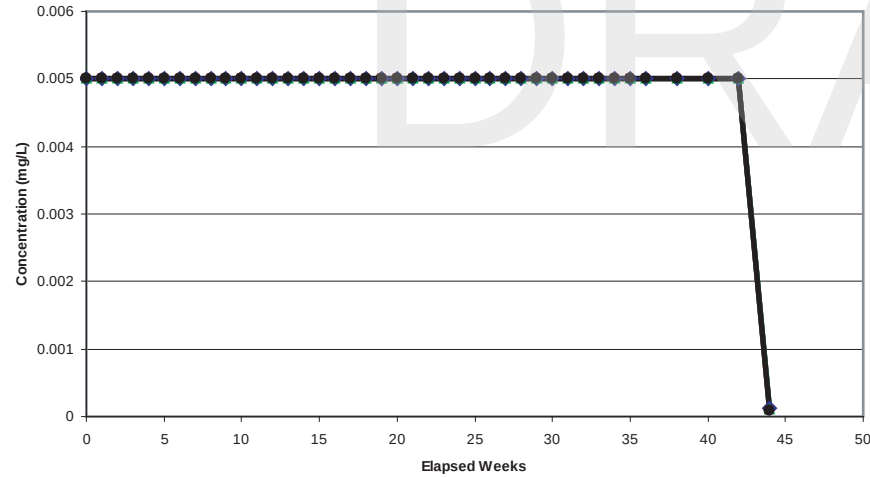
Lead



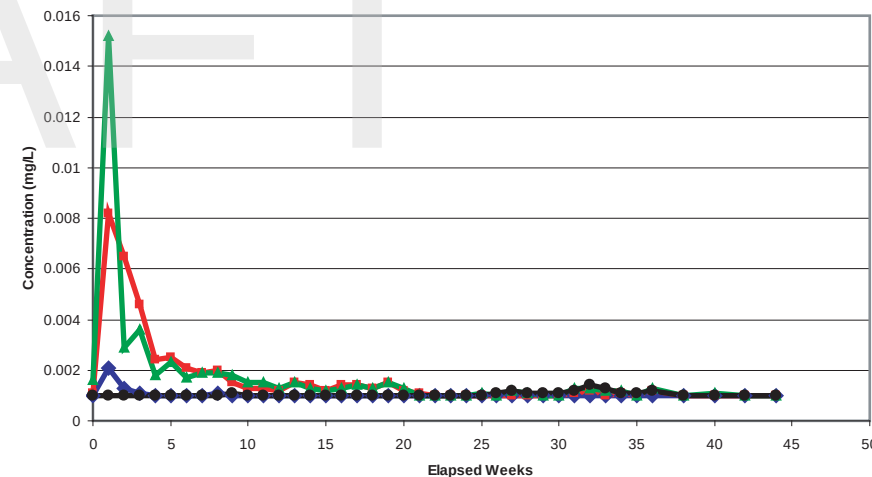
Selenium



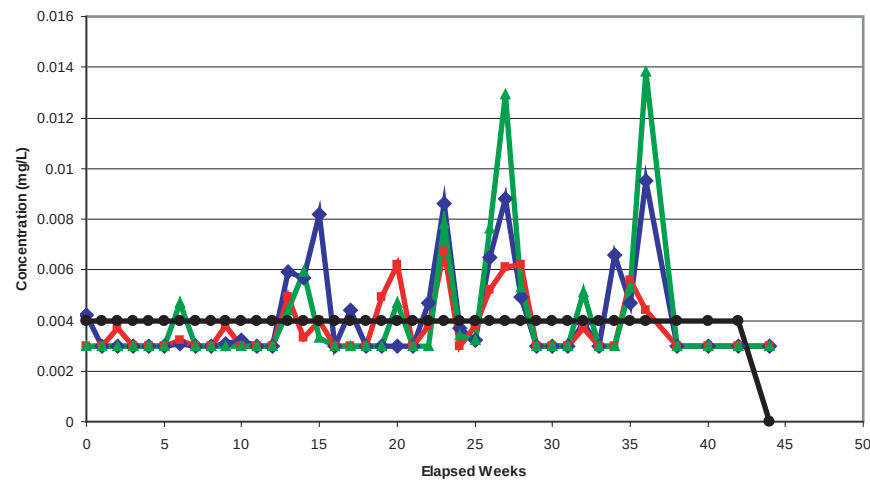
Uranium



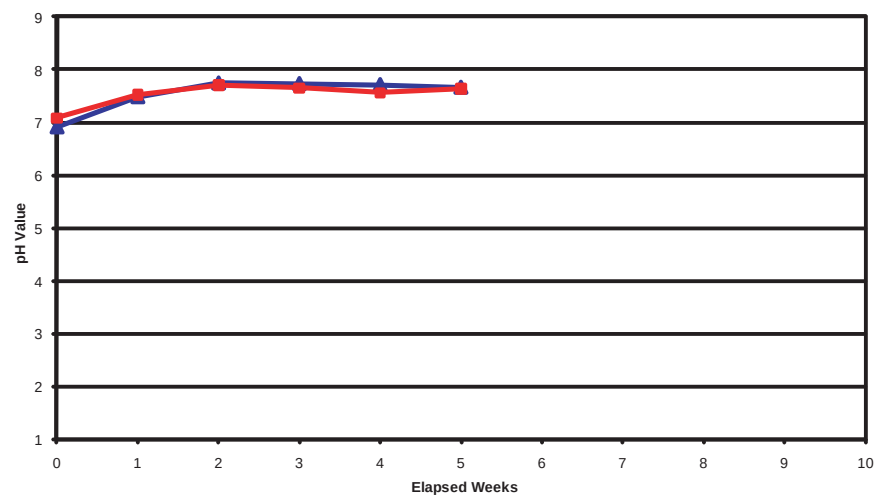
Vanadium



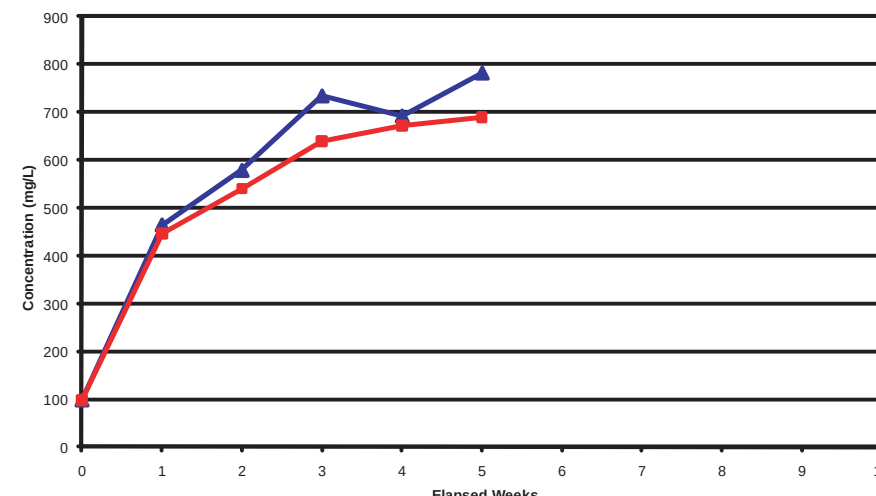
Zinc



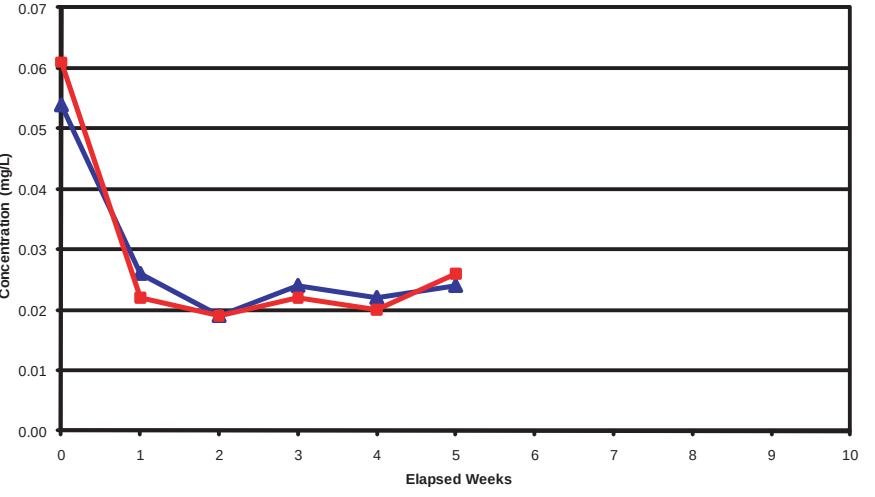
Leachate pH



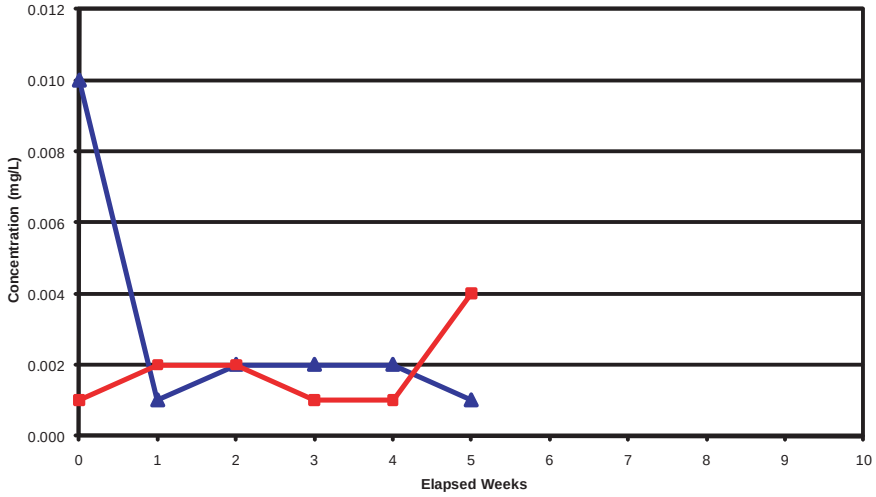
Sulphate



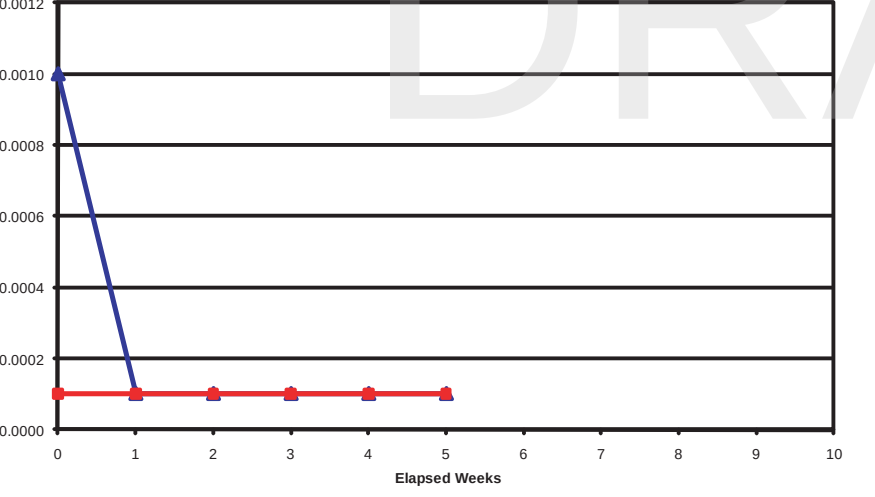
Aluminum



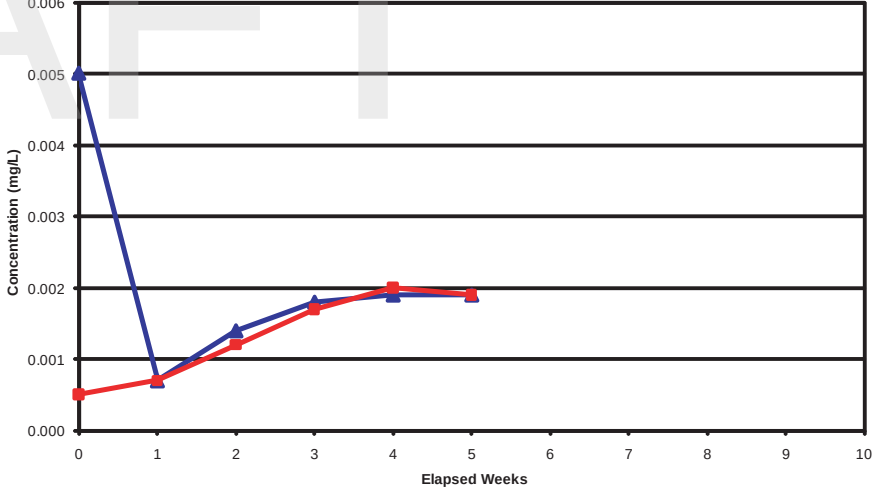
Arsenic



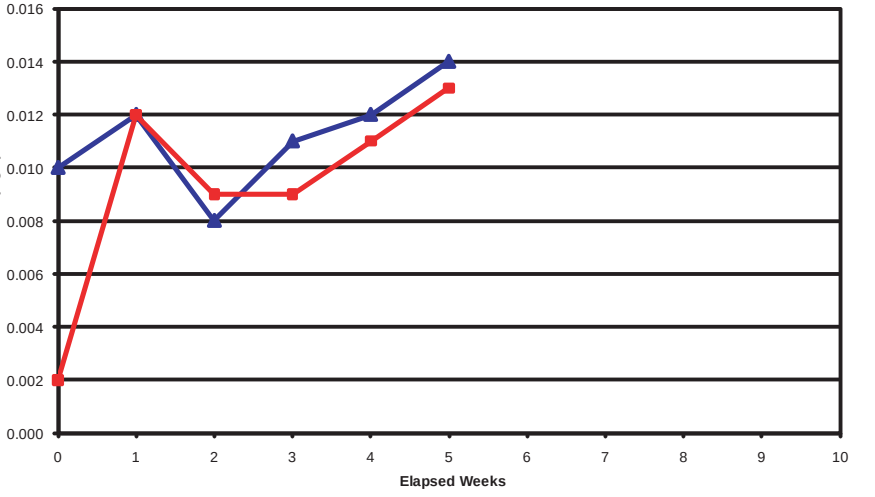
Cadmium



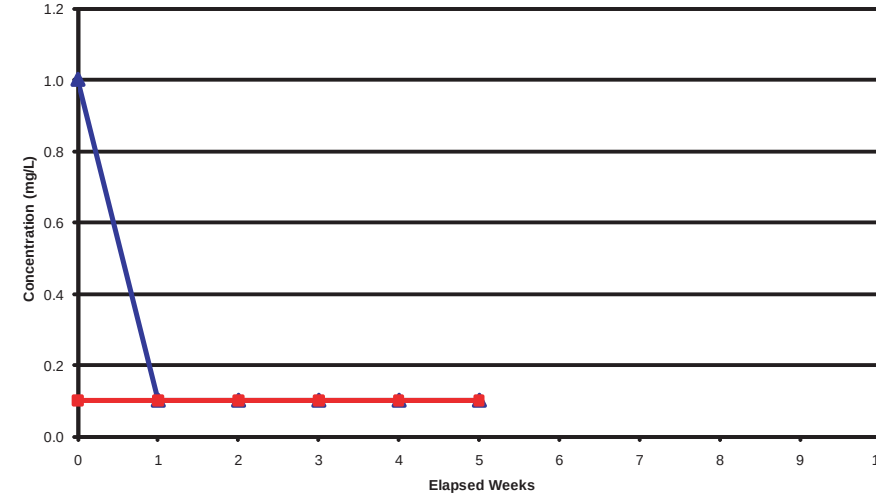
Cobalt



Copper

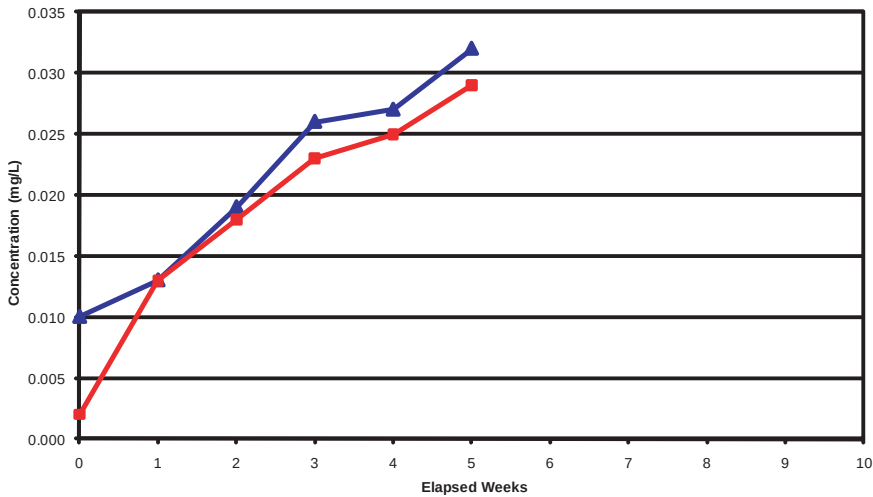


Iron

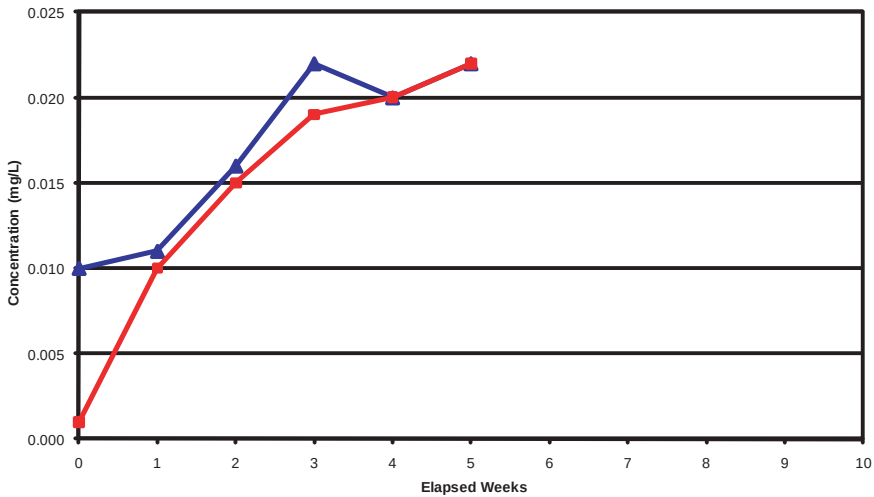


▲ Column 1
■ Column 2

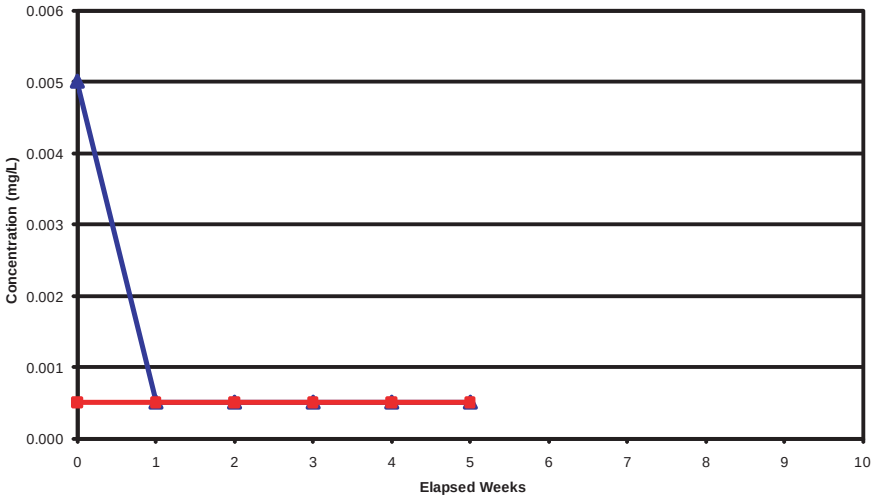
Molybdenum



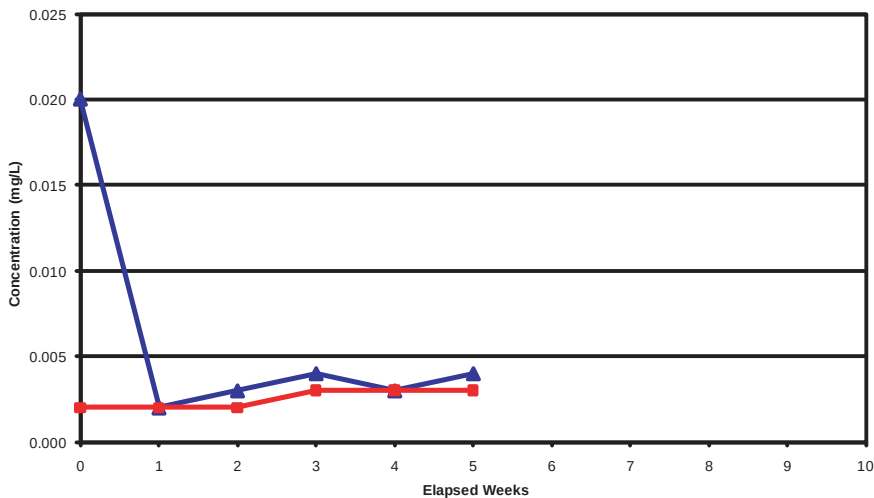
Nickel



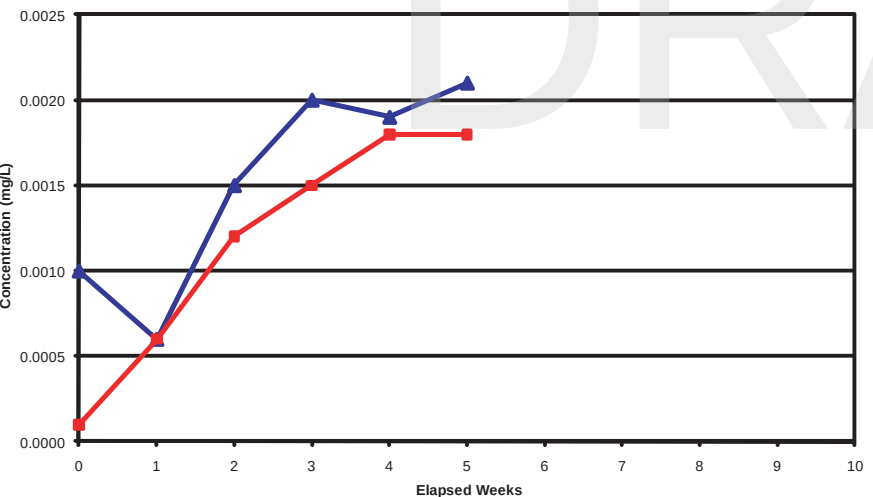
Lead



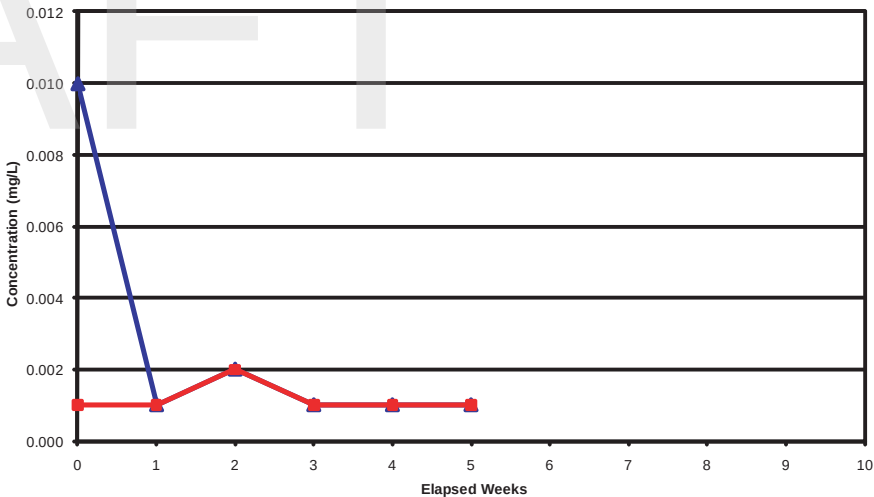
Selenium



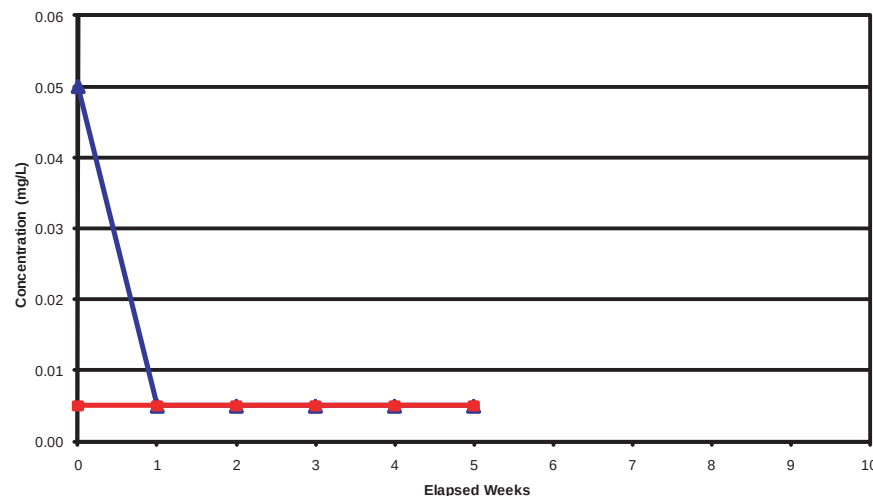
Uranium



Vanadium

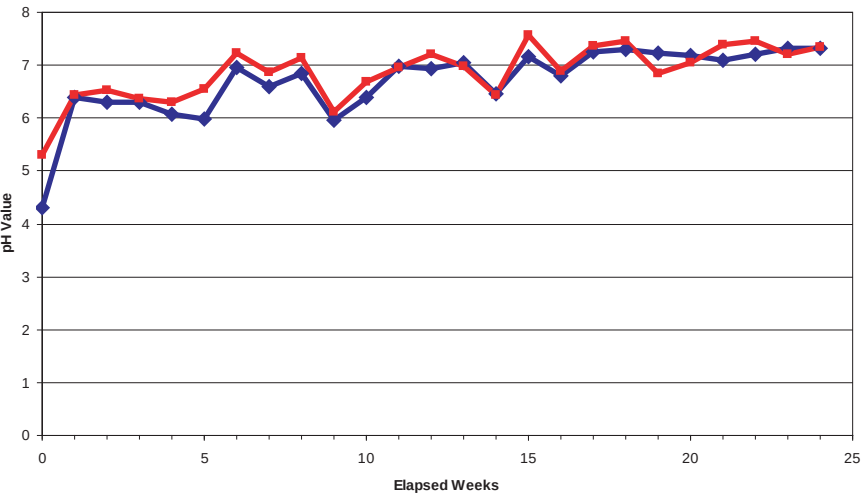


Zinc

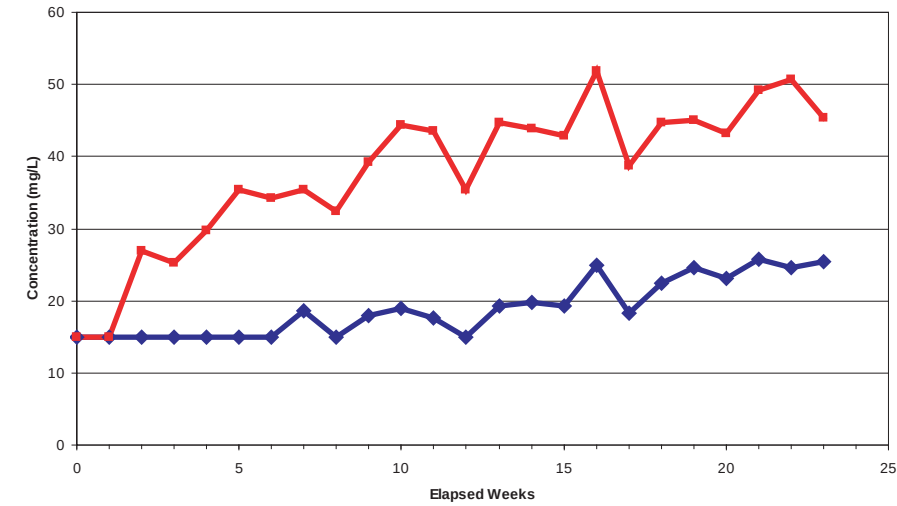


▲ Column 1
■ Column 2

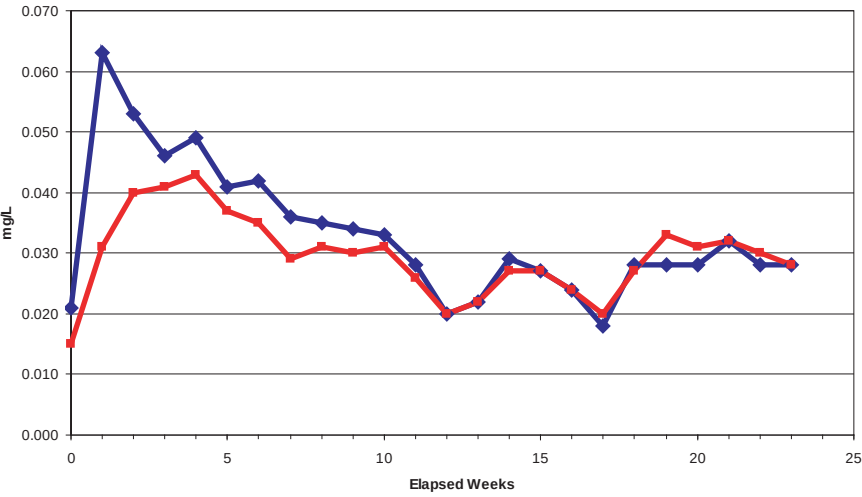
Leachate pH



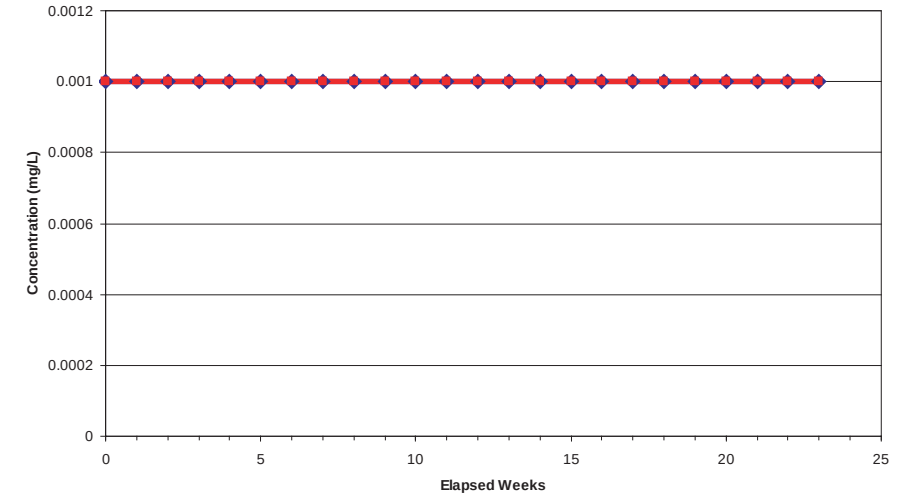
Sulphate



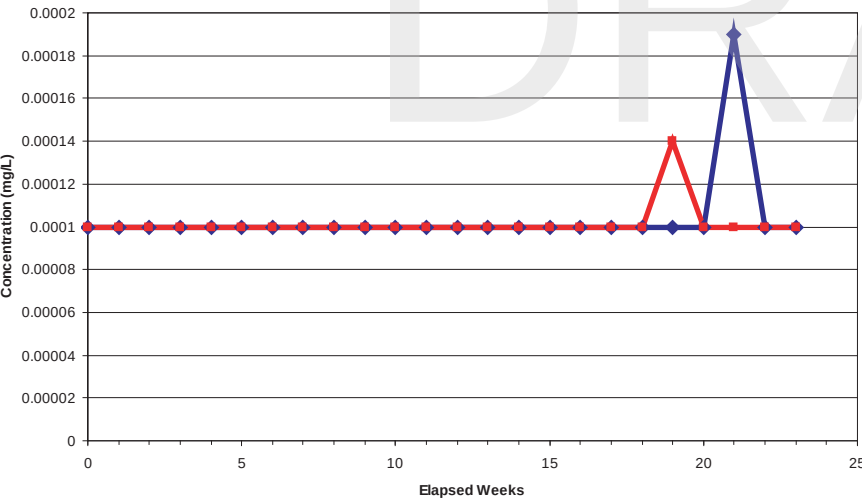
Aluminum



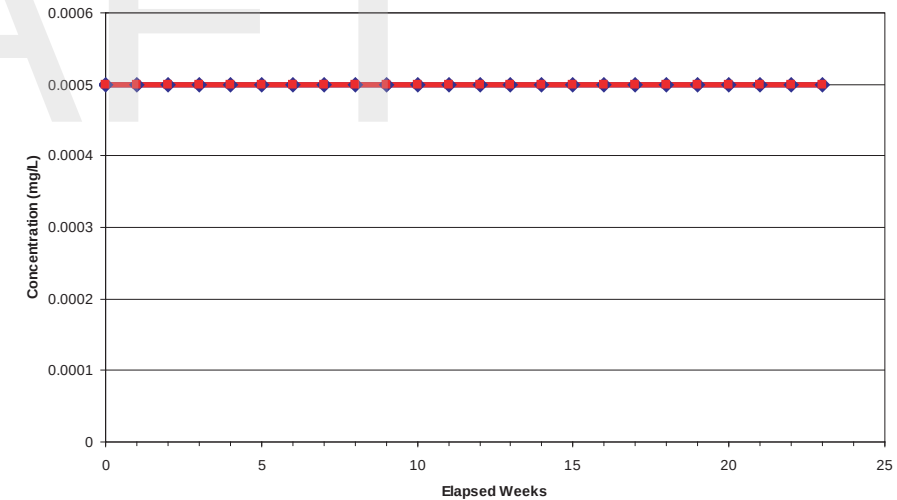
Arsenic



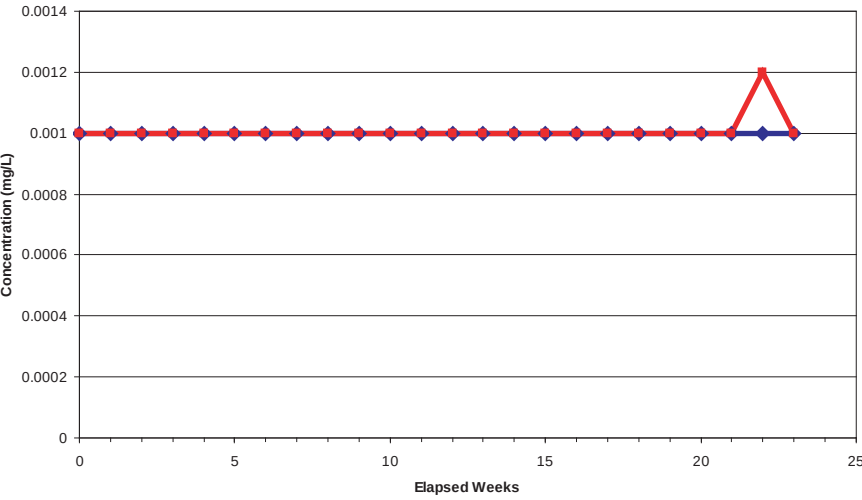
Cadmium



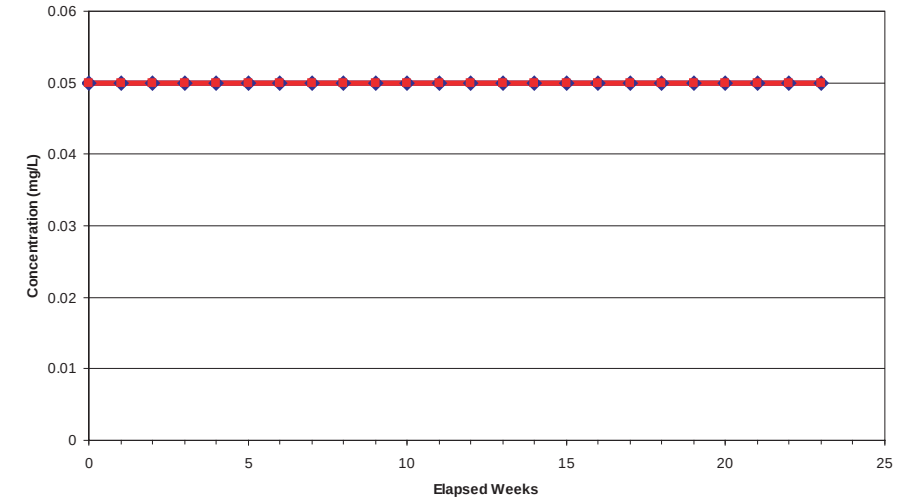
Cobalt



Copper

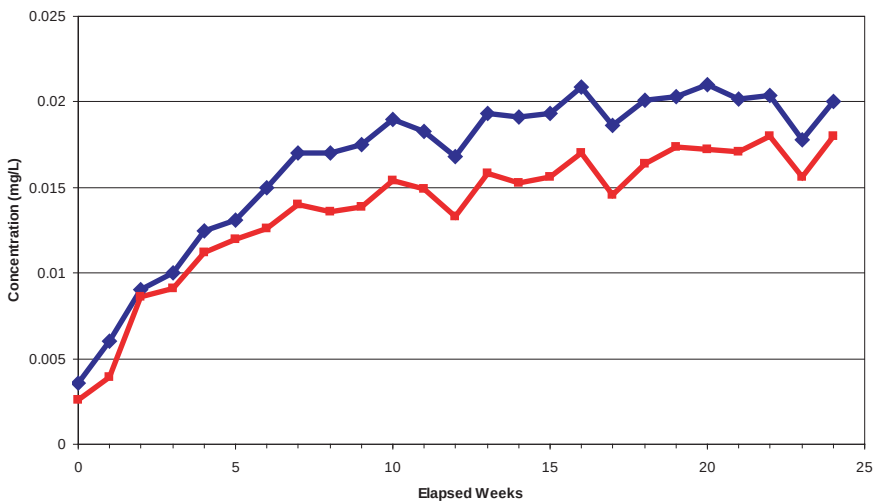


Iron

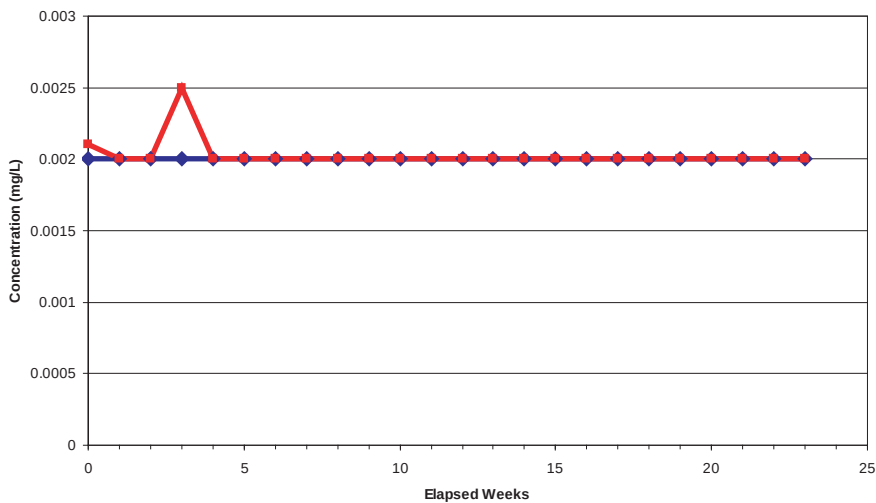


▲ Composite 1
■ Composite 2

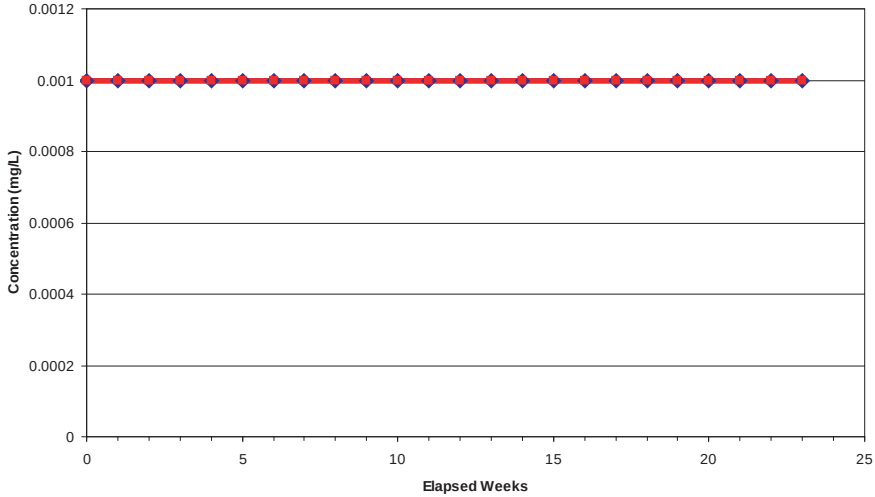
Molybdenum



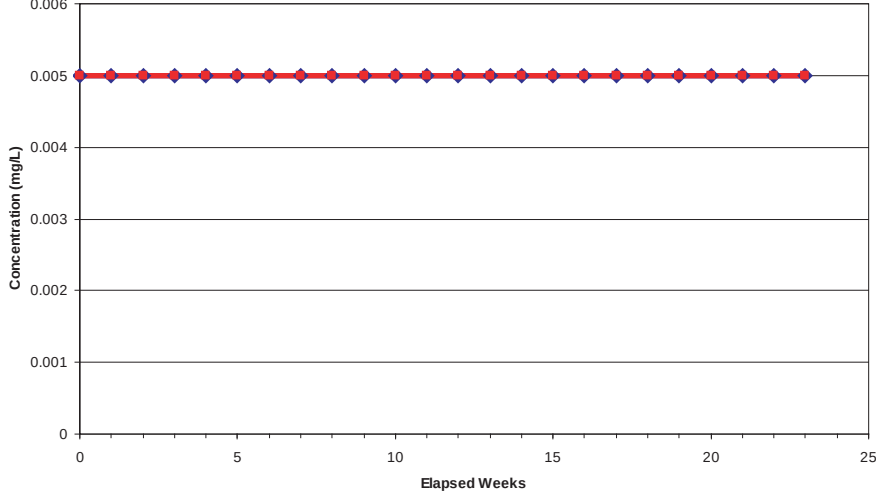
Nickel



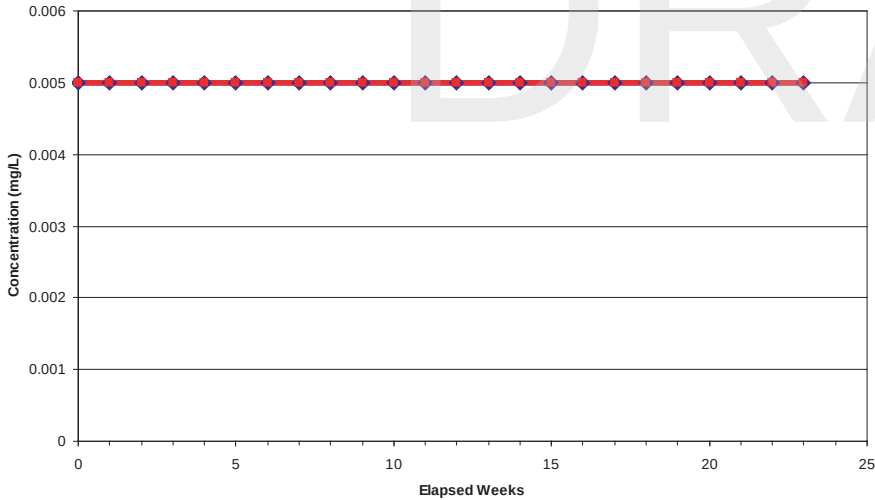
Lead



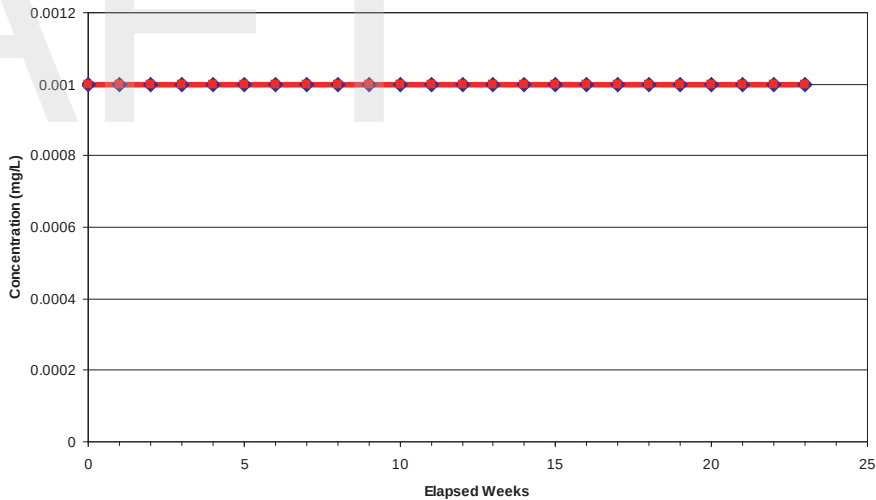
Selenium



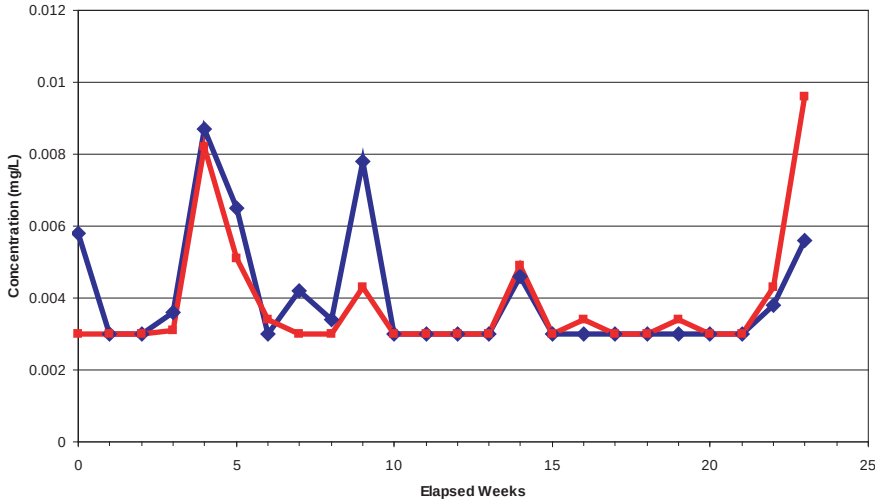
Uranium



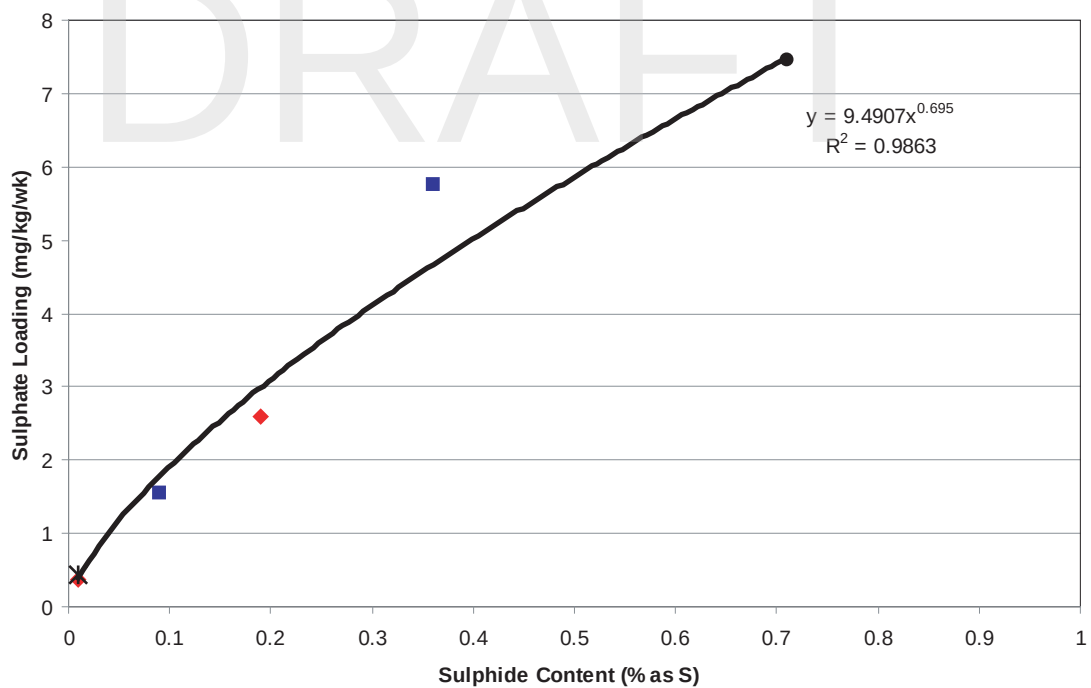
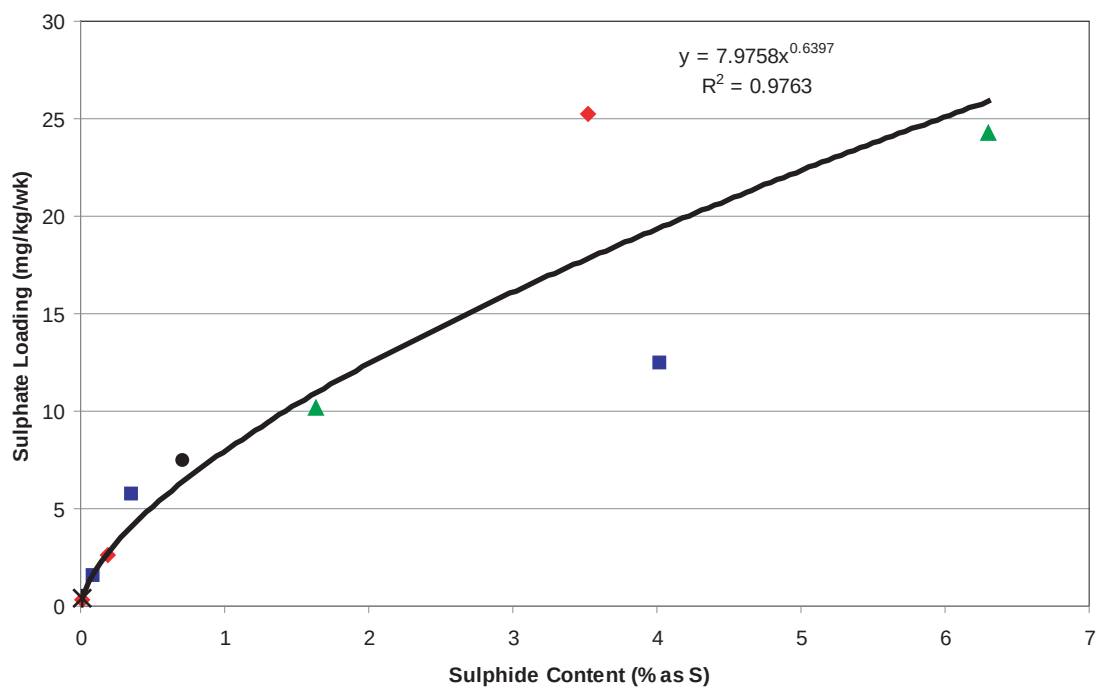
Vanadium



Zinc



Composite 1
Composite 2



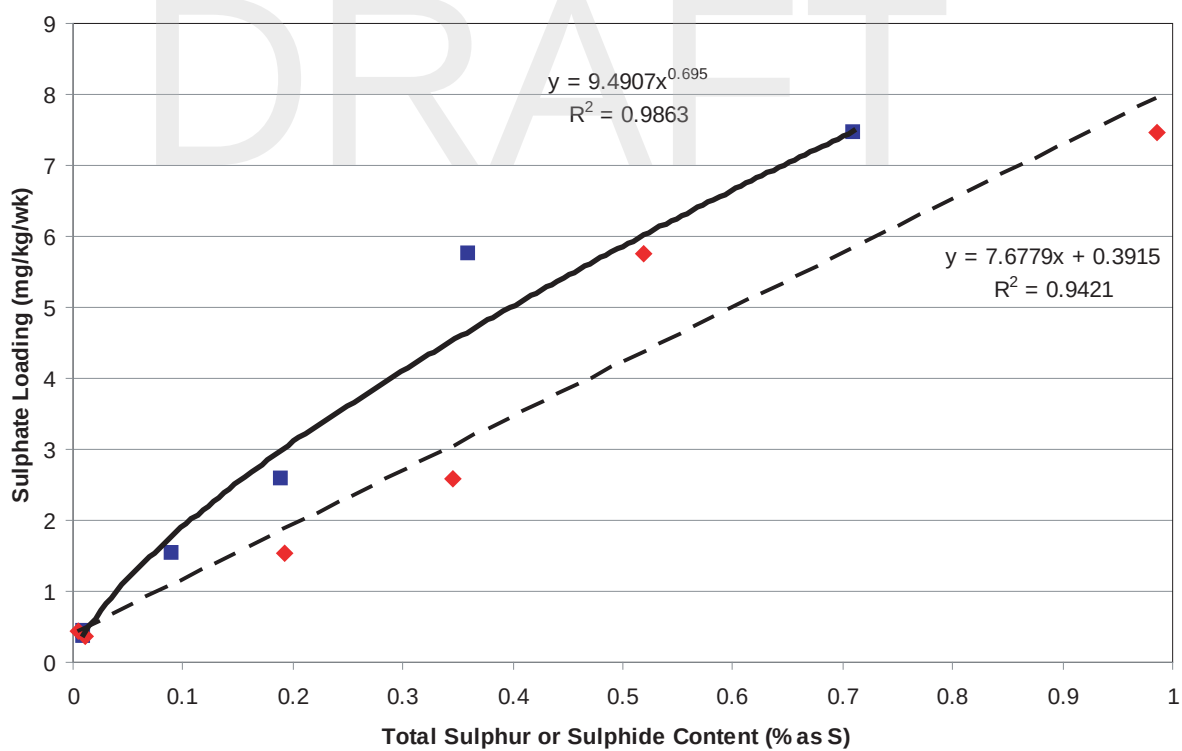
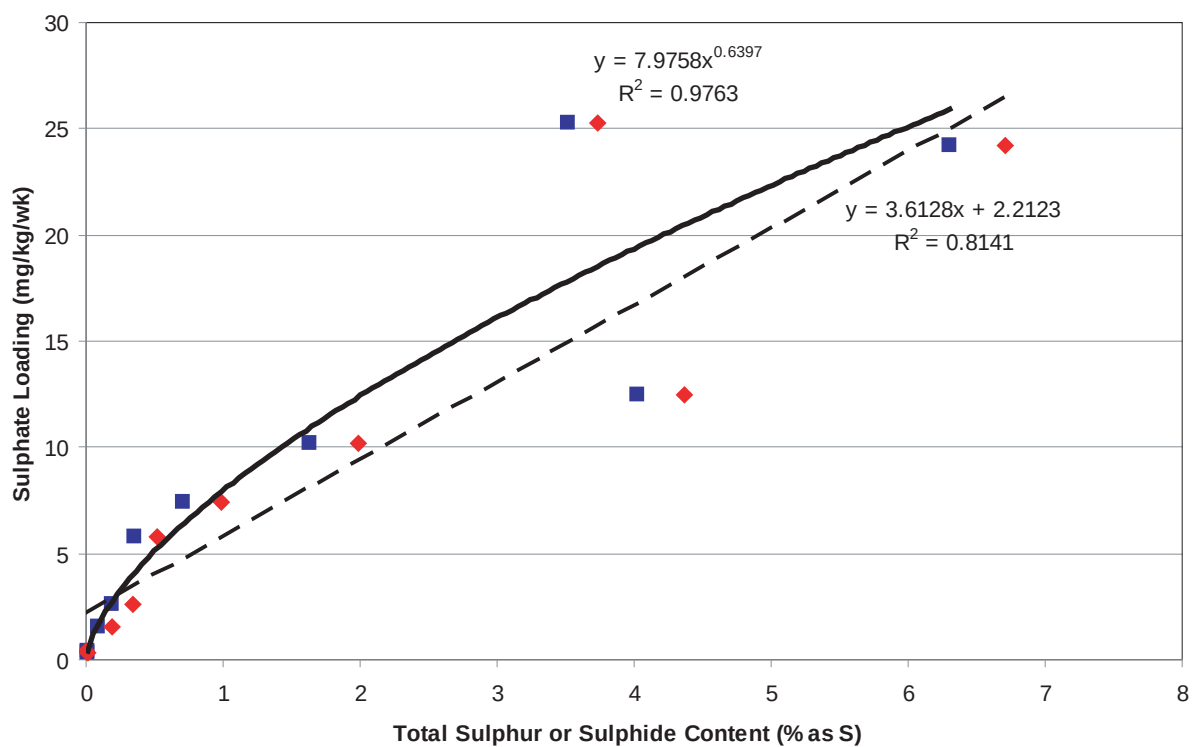
- Eastern Gabbro
- ◆ Two Duck Gabbro
- ▲ Volcanic
- Breccia
- ✕ Syenite

Marathon PGM

Correlation Between Sulphide Sulphur and
Sulphate Loading Rate From Mine Rock



Figure 4.11



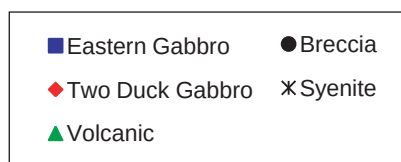
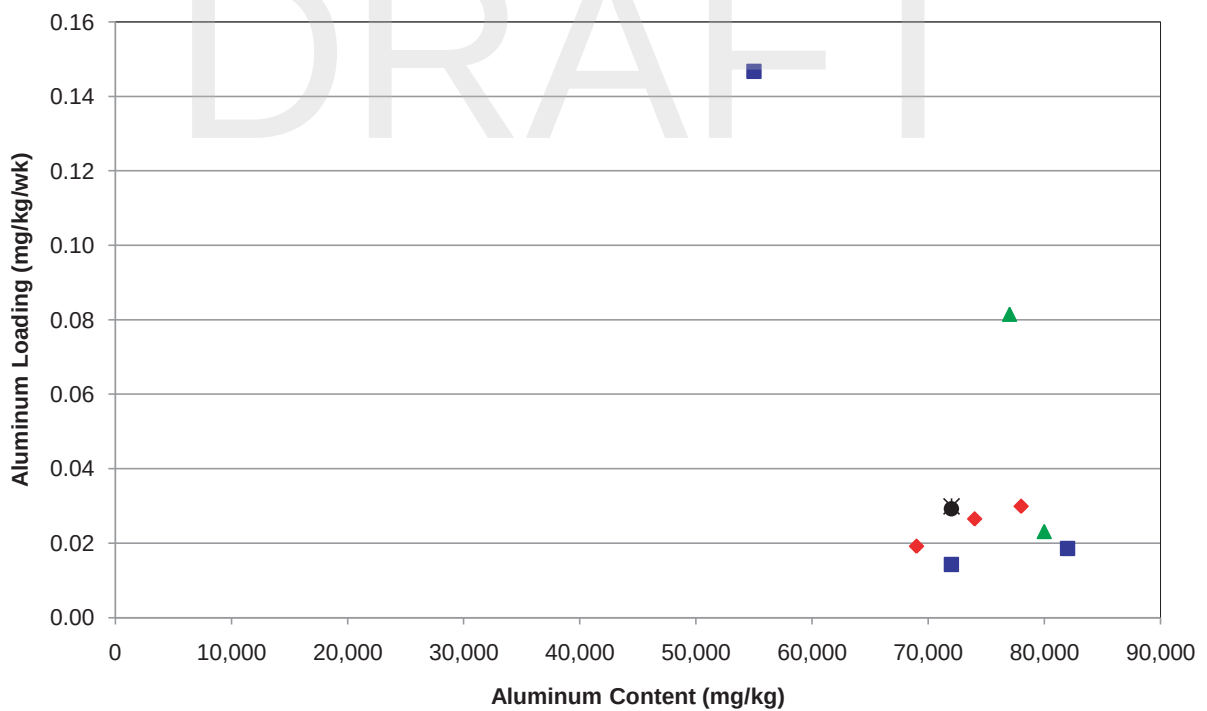
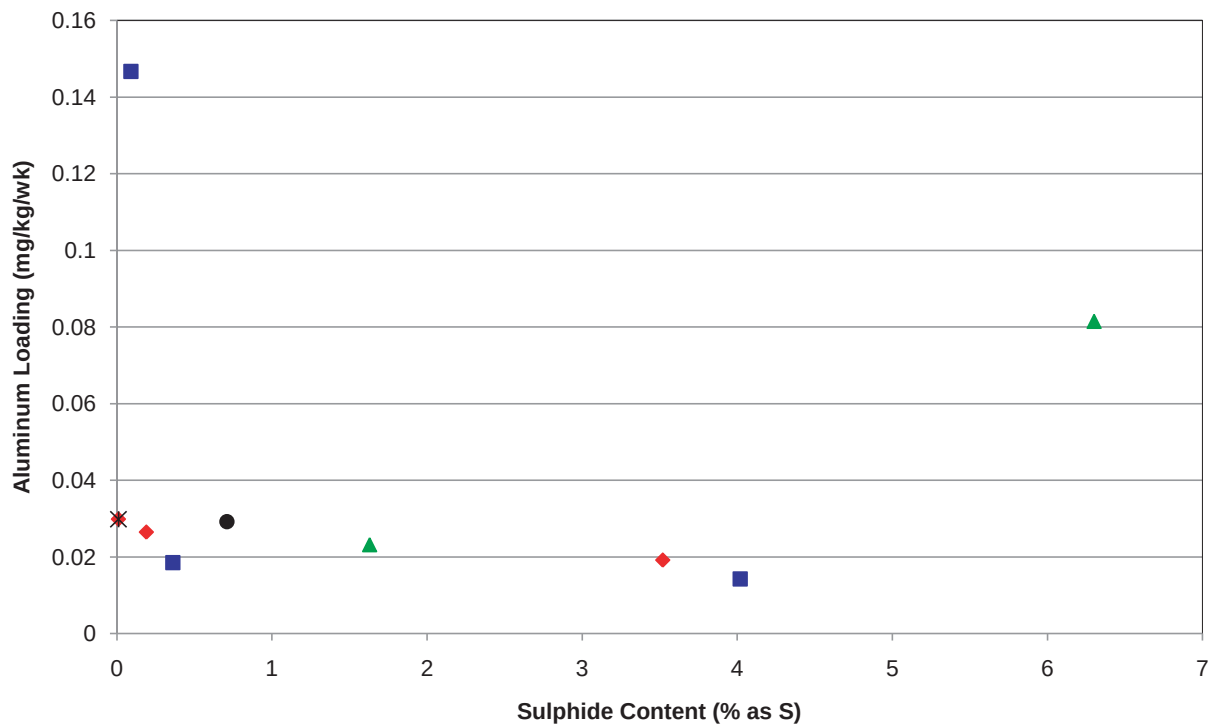
- Sulphide Content (wt% as S)
- ◆ Total S (wt % as S)
- Linear (Total S (wt % as S))
- Power (Sulphide Content (wt% as S))

Marathon PGM

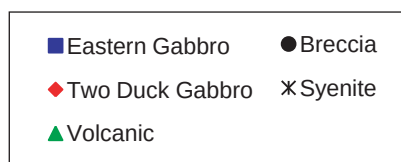
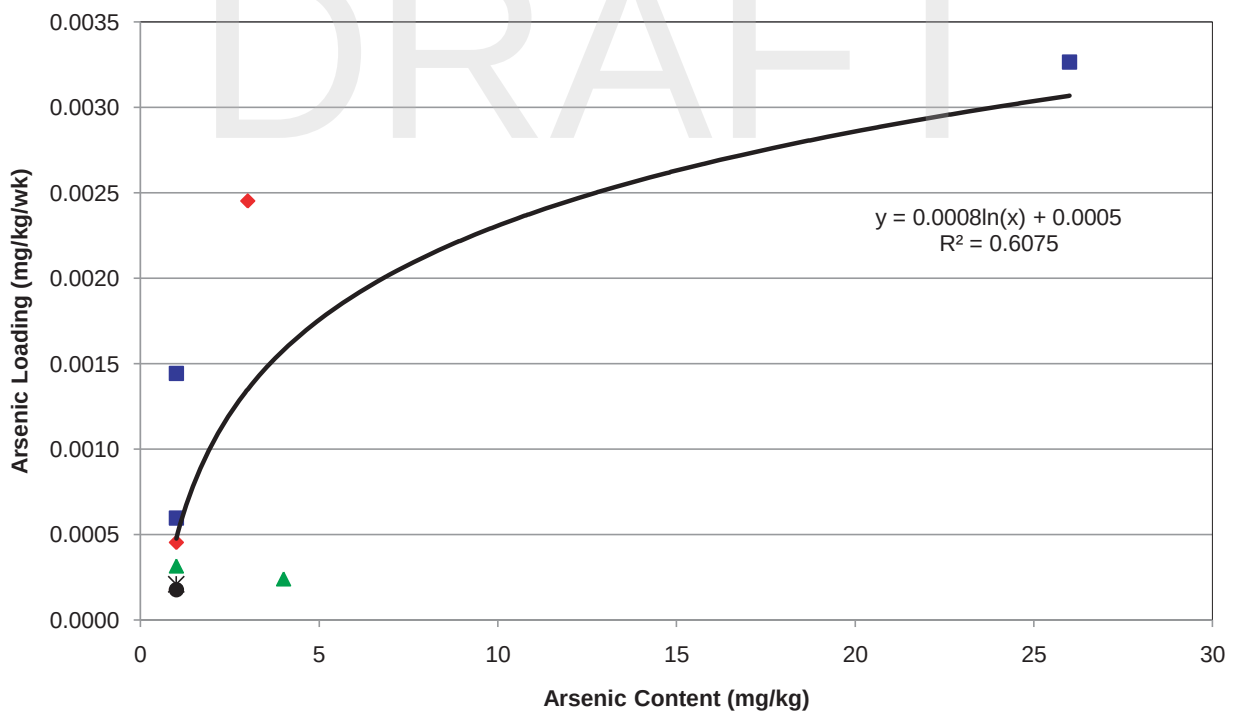
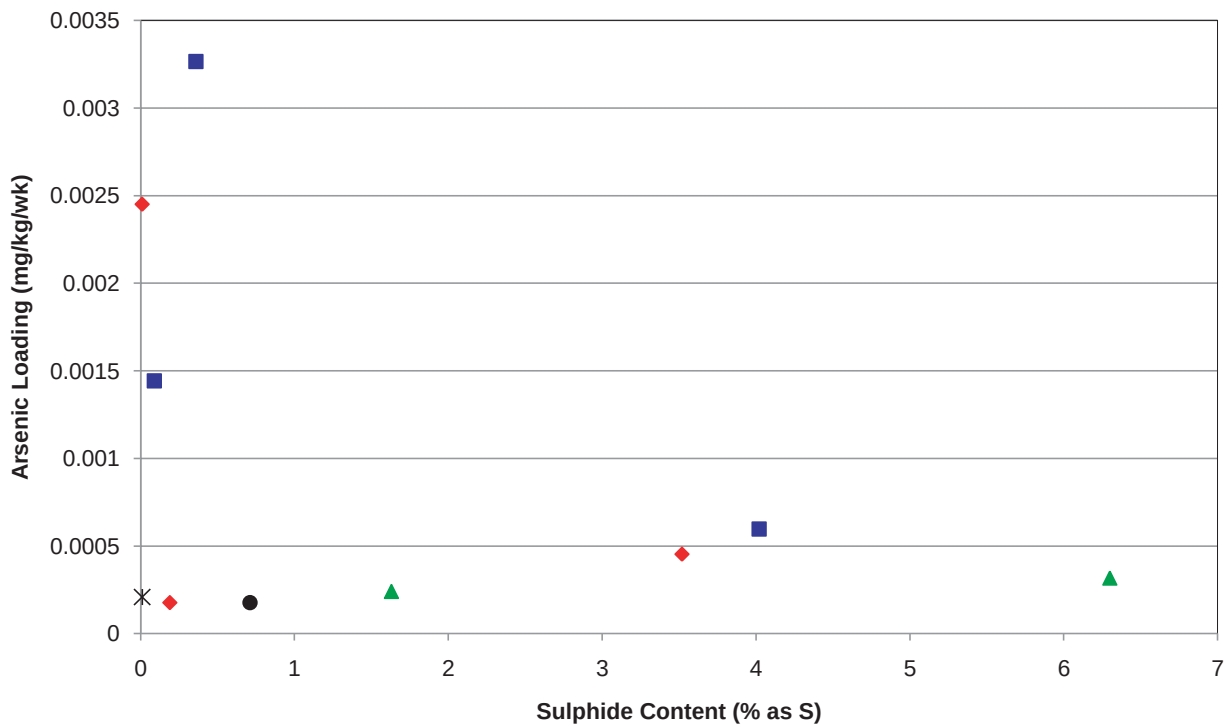
Correlation Between Leachable Sulphur and
Total Sulphur and Sulphide Content in Mine Rock

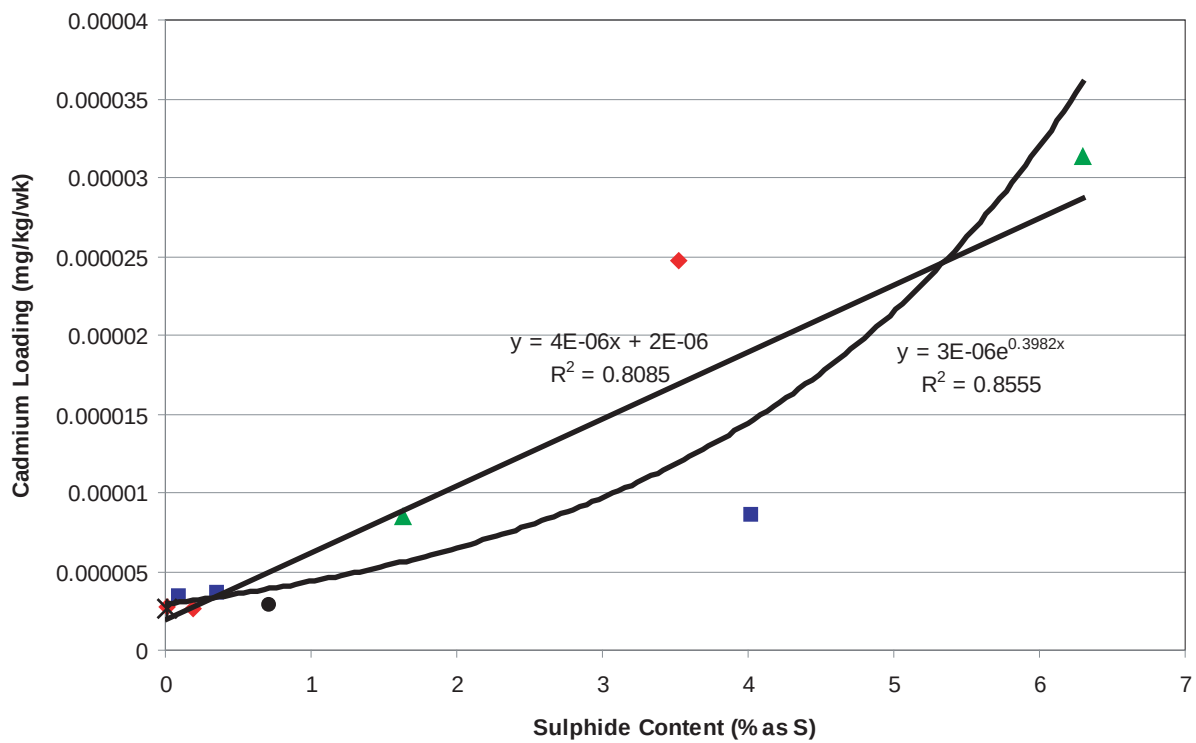


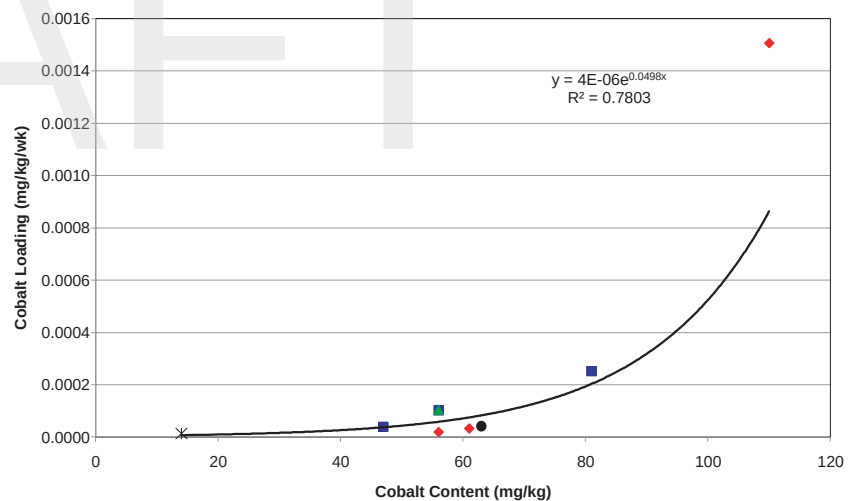
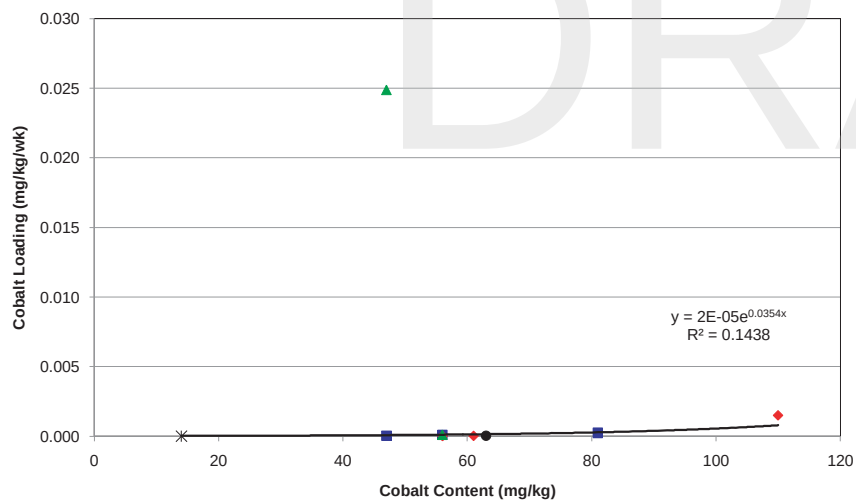
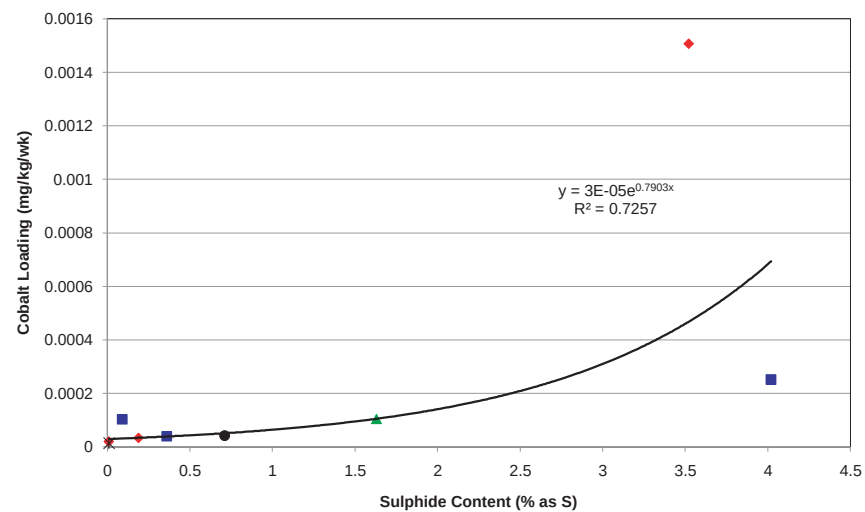
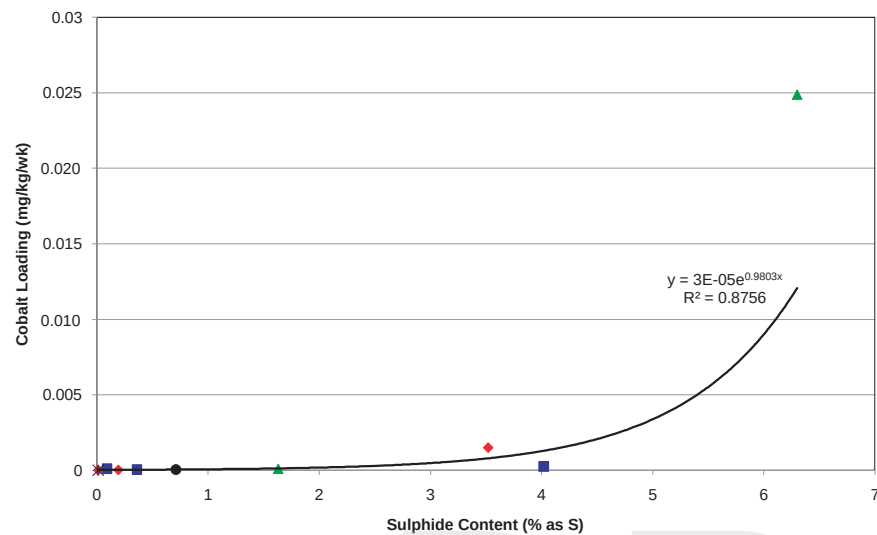
Figure 4.12



Marathon PGM		
Calculated Loading Rate for Aluminum from Mine Rock Humidity Cell Tests		
		Figure 4.13







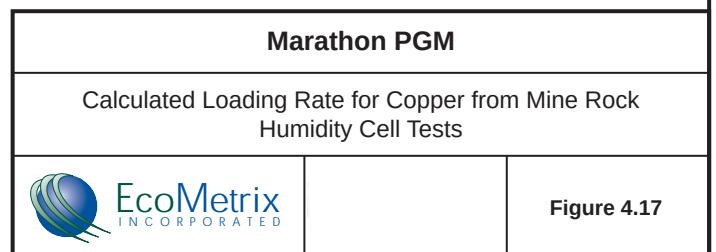
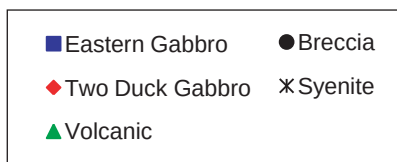
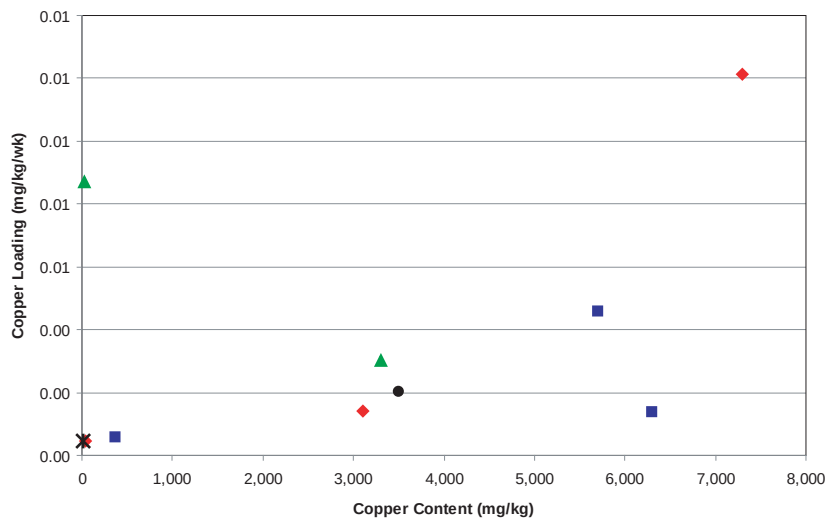
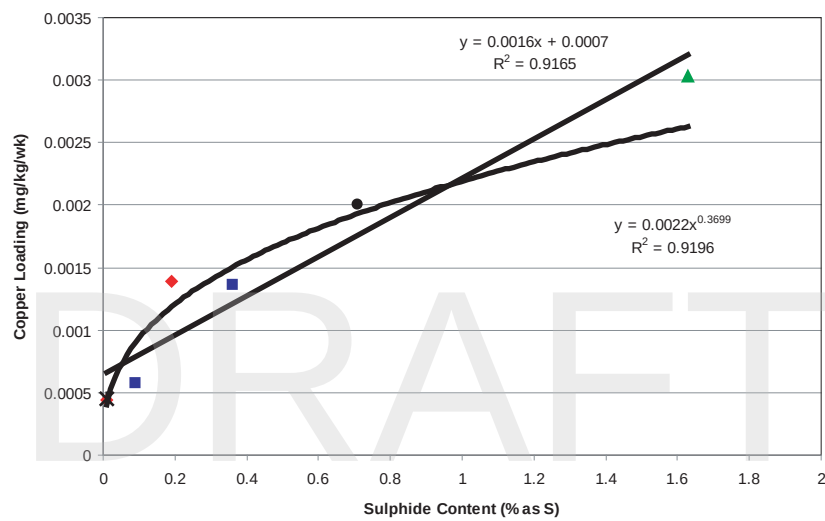
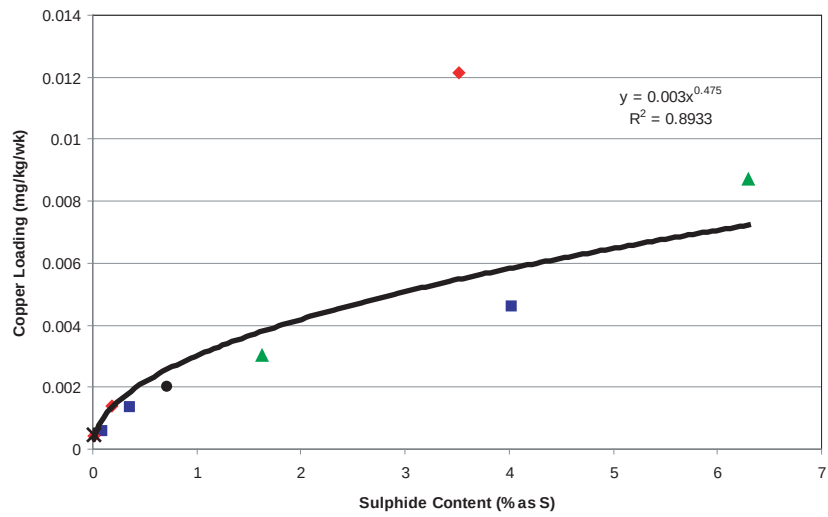
■ Eastern Gabbro ● Breccia
◆ Two Duck Gabbro ✱ Syenite
▲ Volcanic

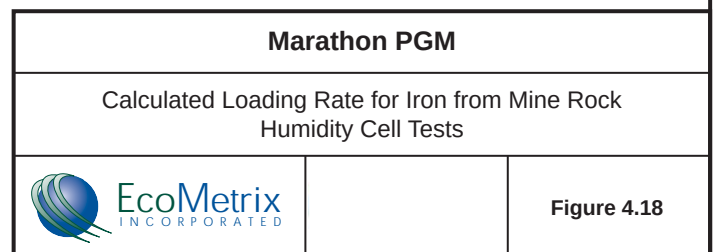
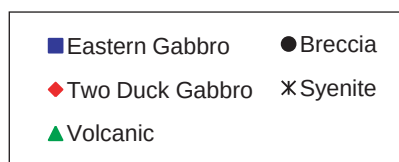
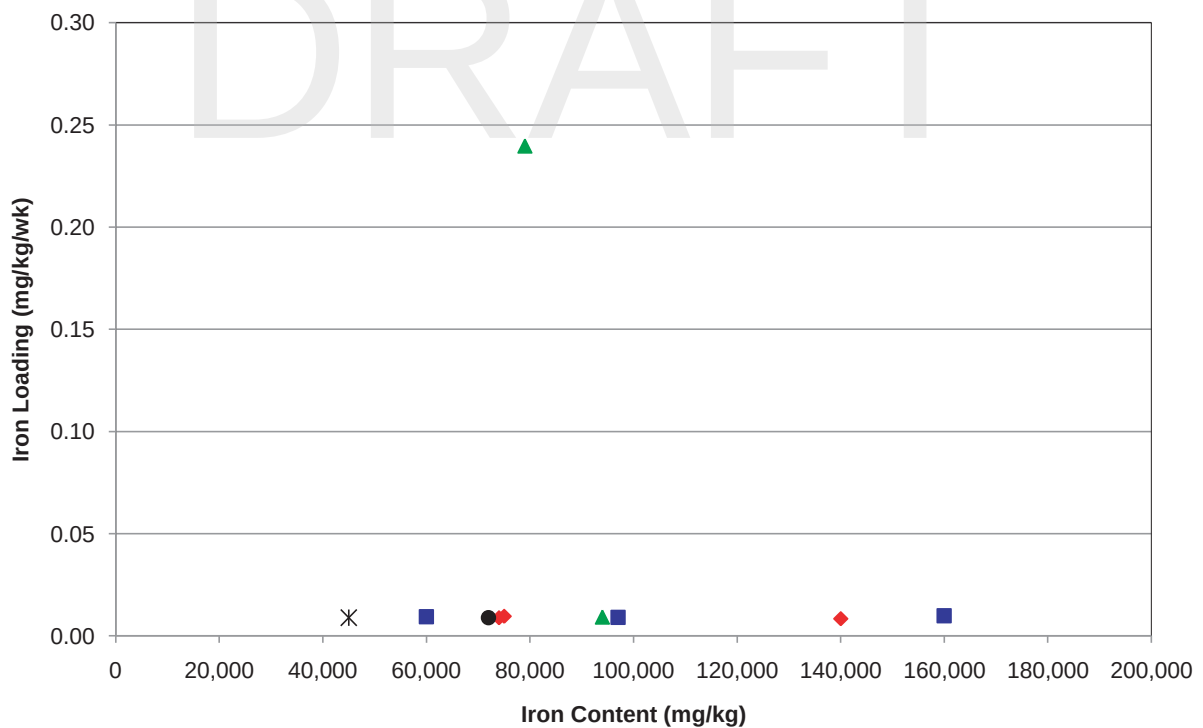
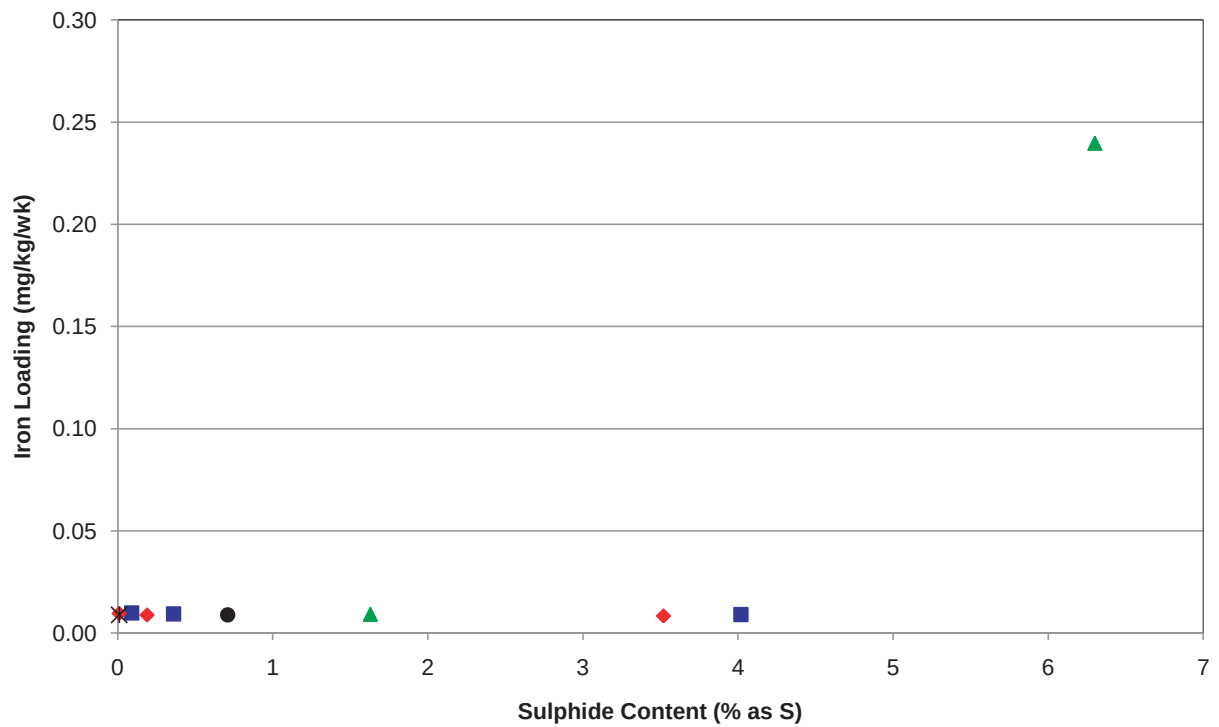
Marathon PGM

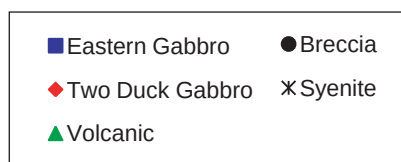
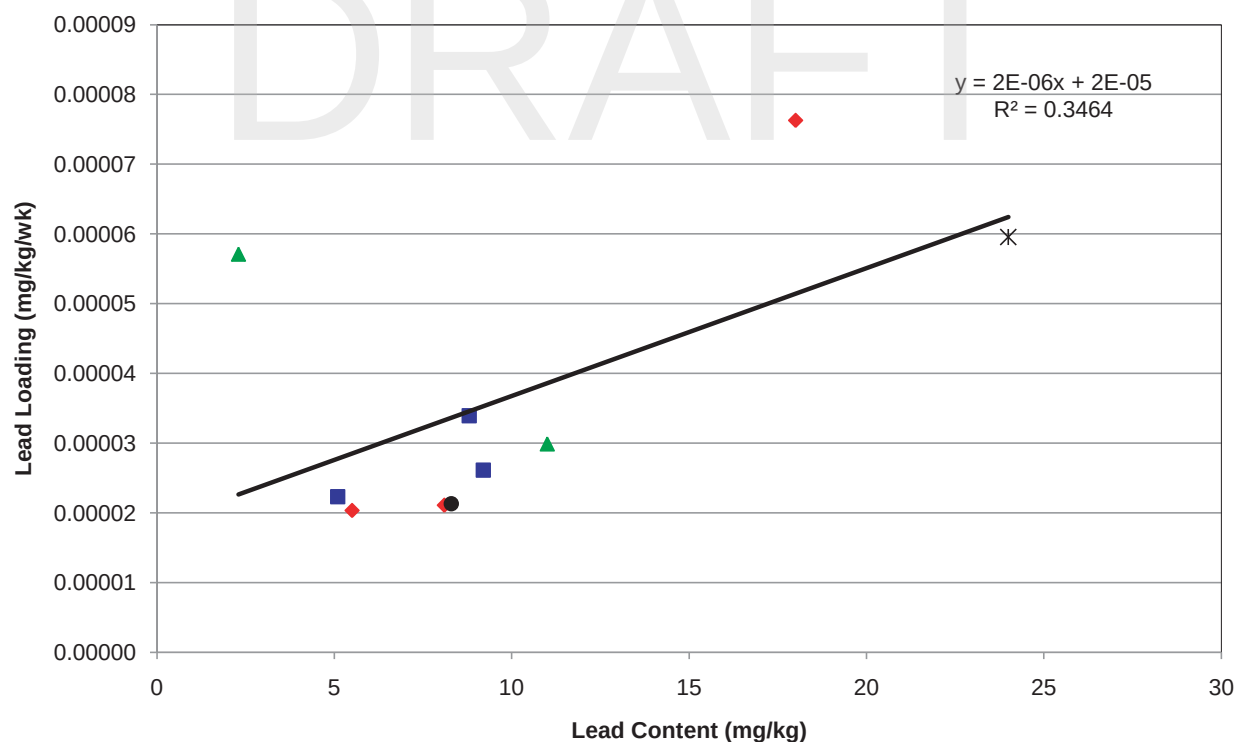
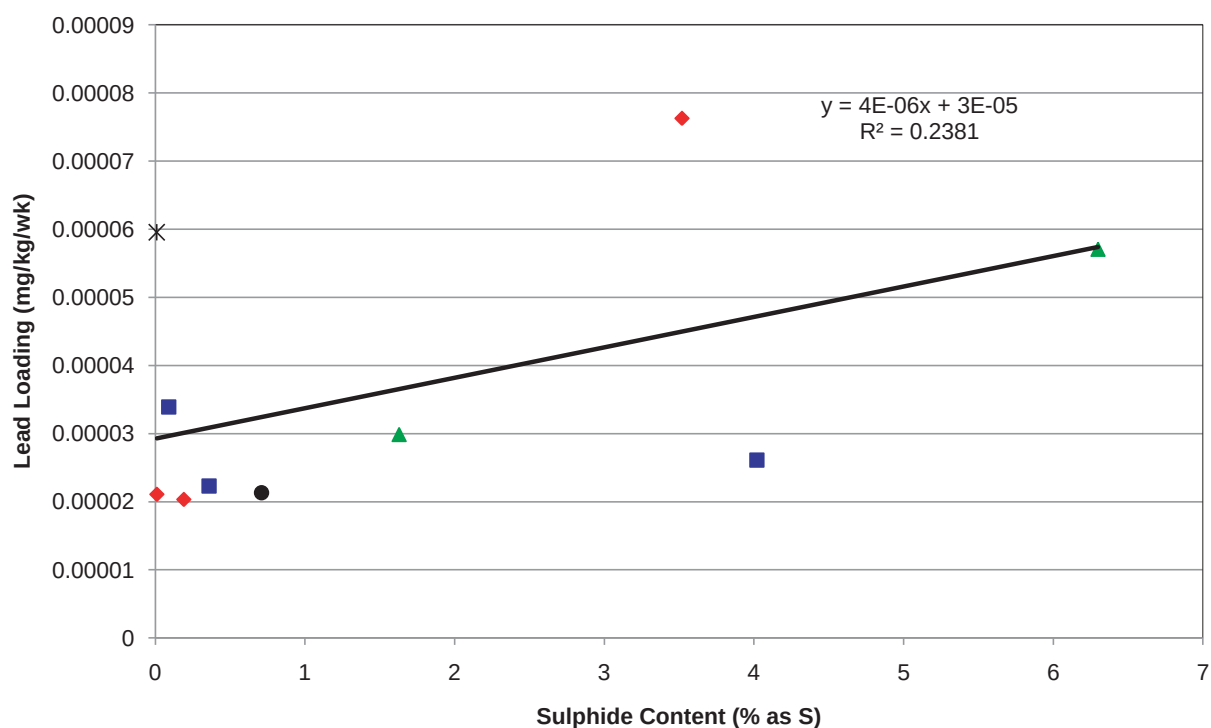
Calculated Loading Rate for Cobalt from Mine Rock
Humidity Cell Tests



Figure 4.16





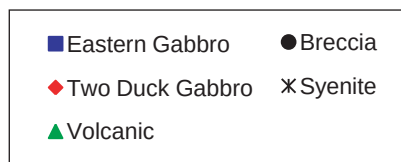
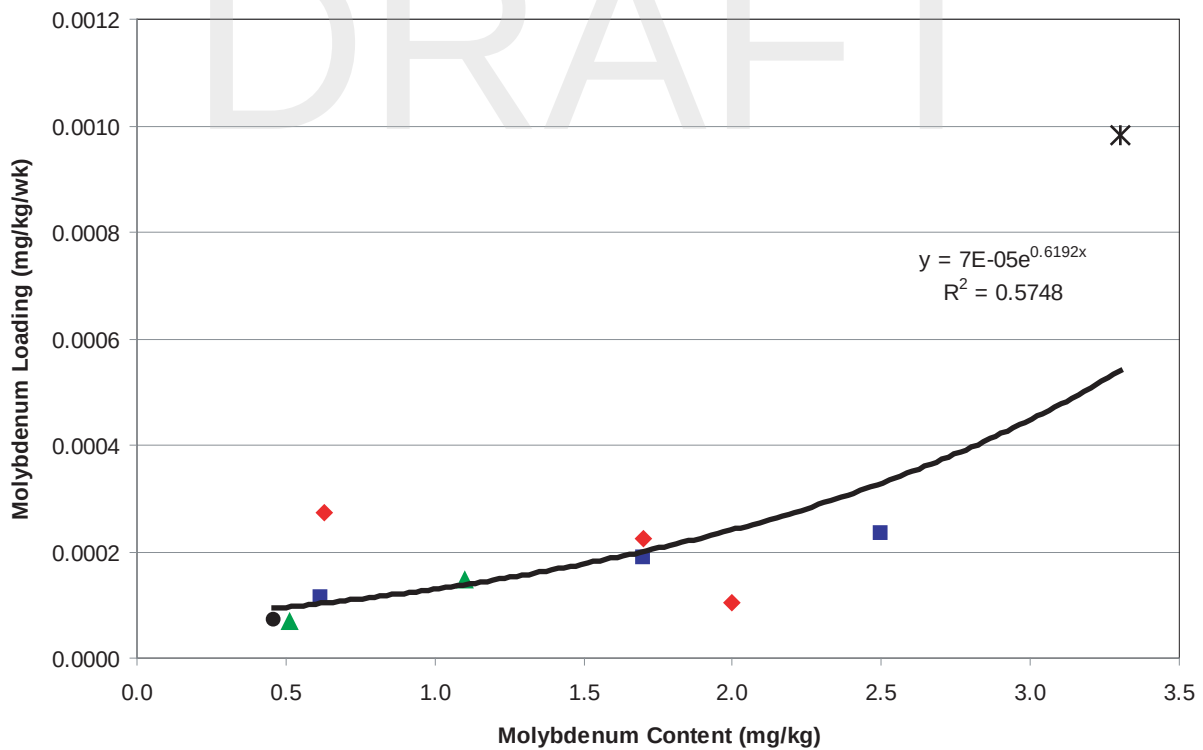
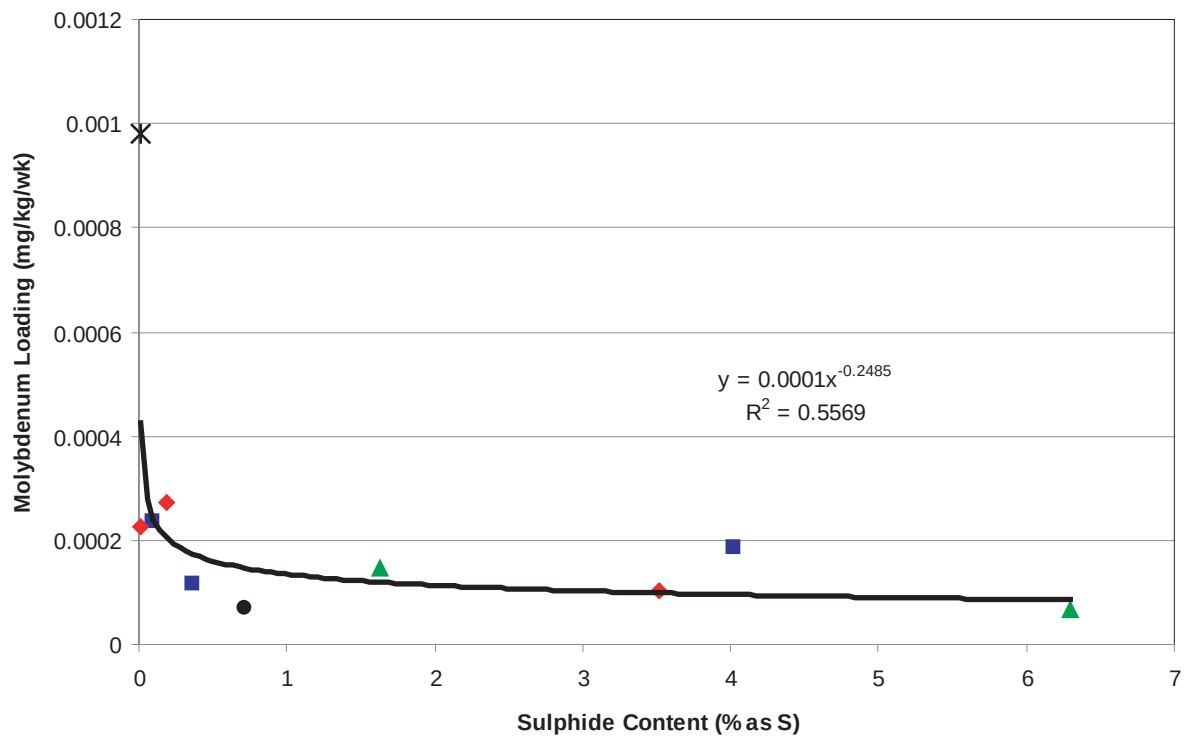


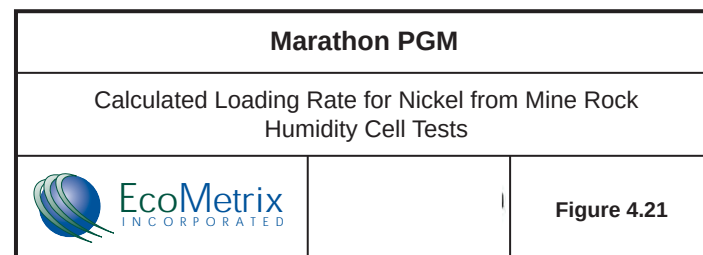
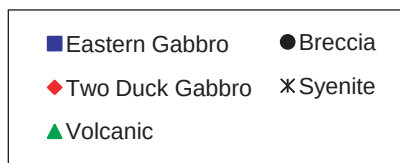
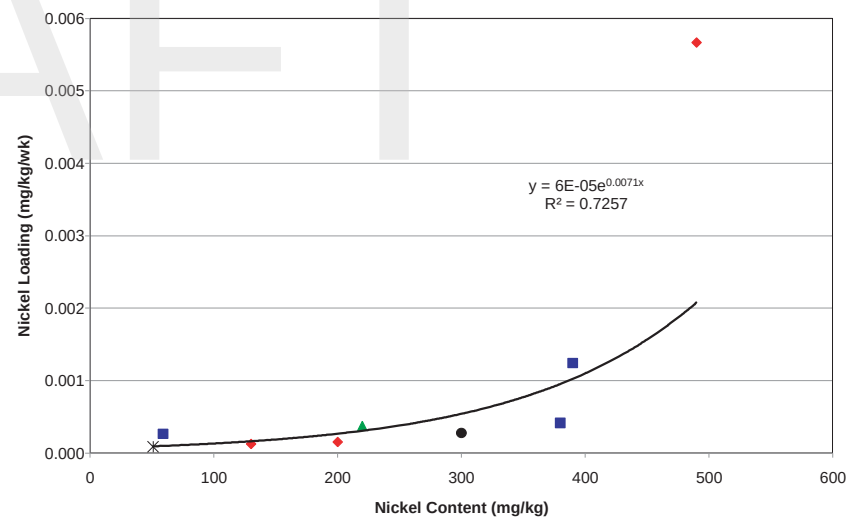
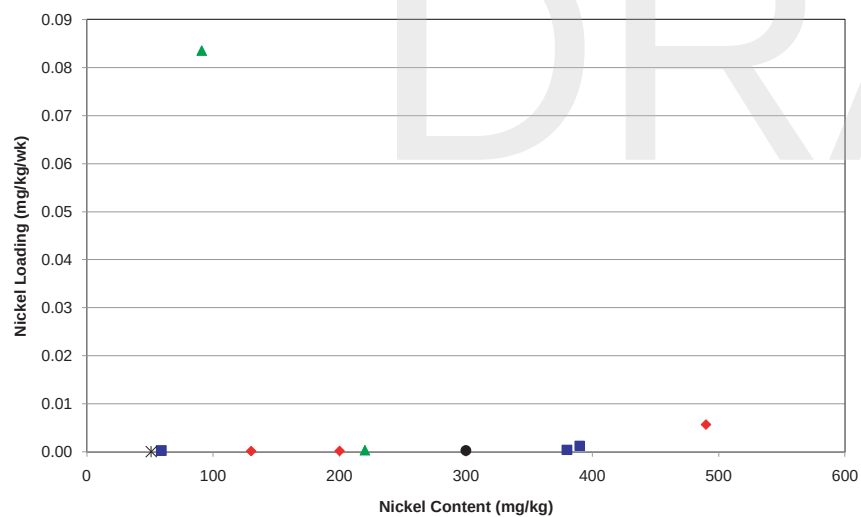
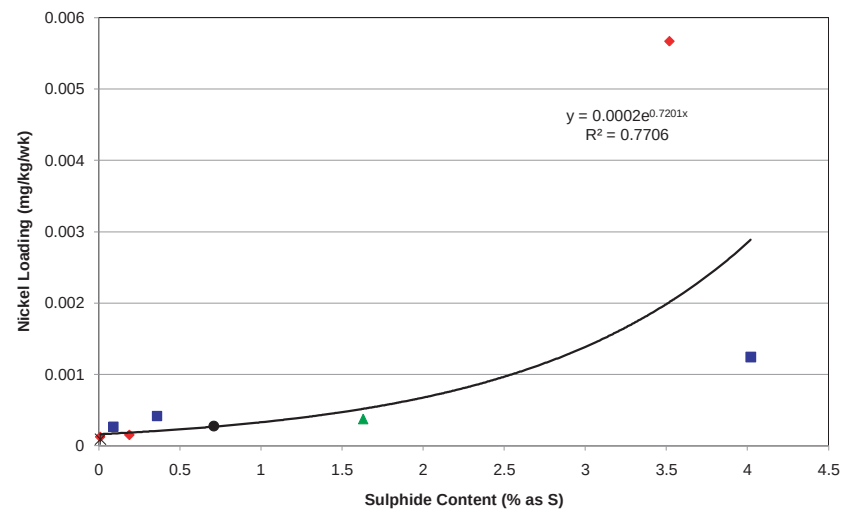
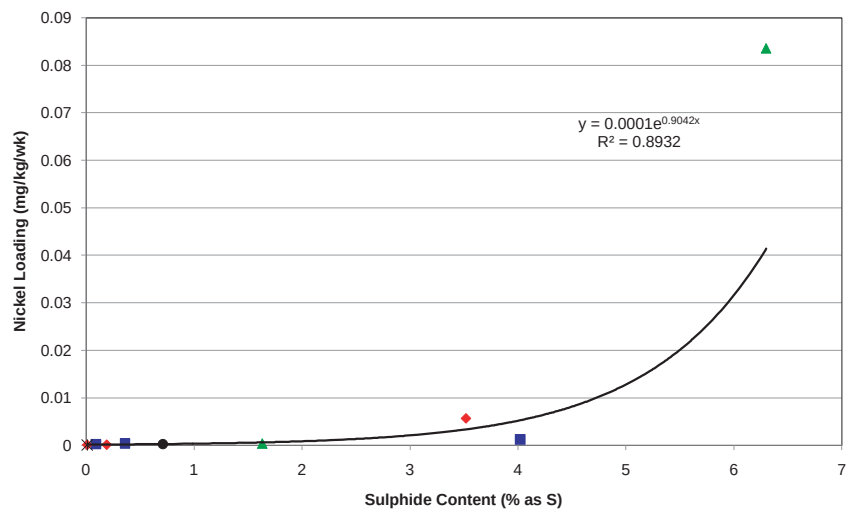
Marathon PGM

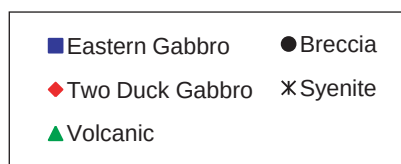
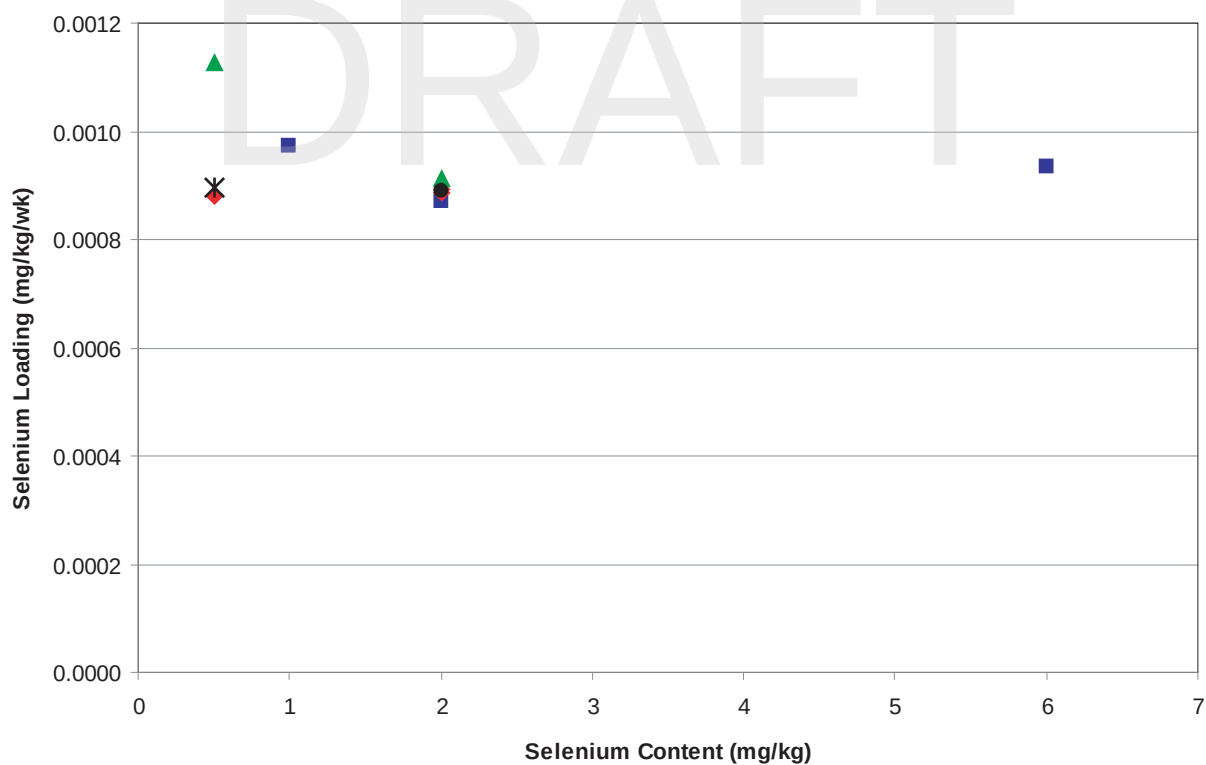
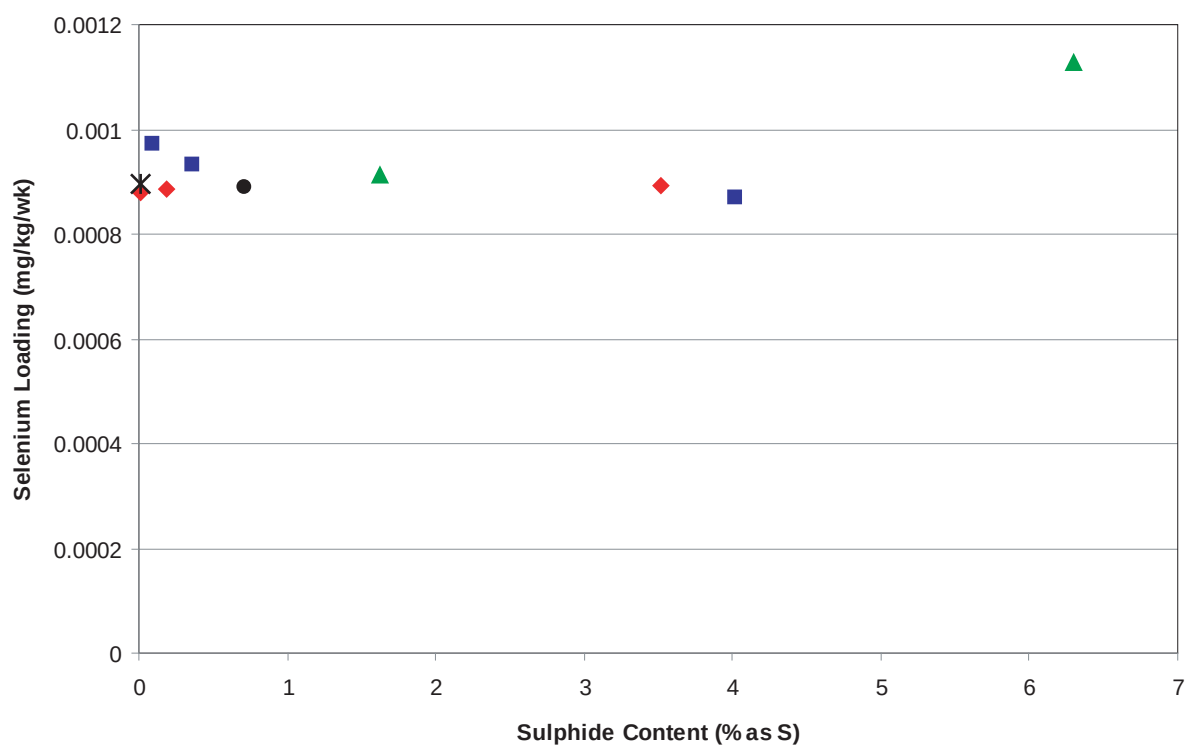
Calculated Loading Rate for Lead from Mine Rock
Humidity Cell Tests

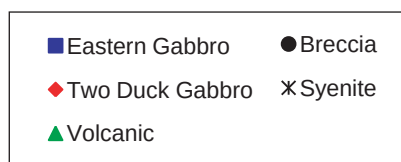
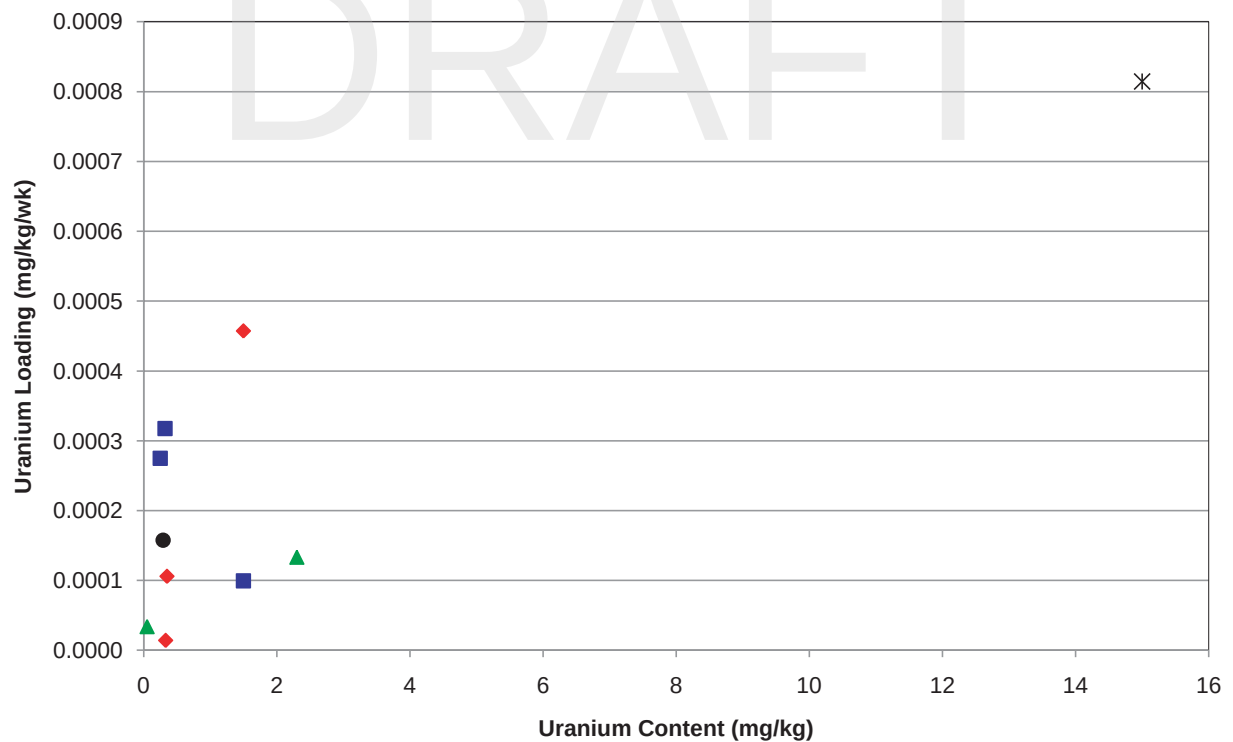
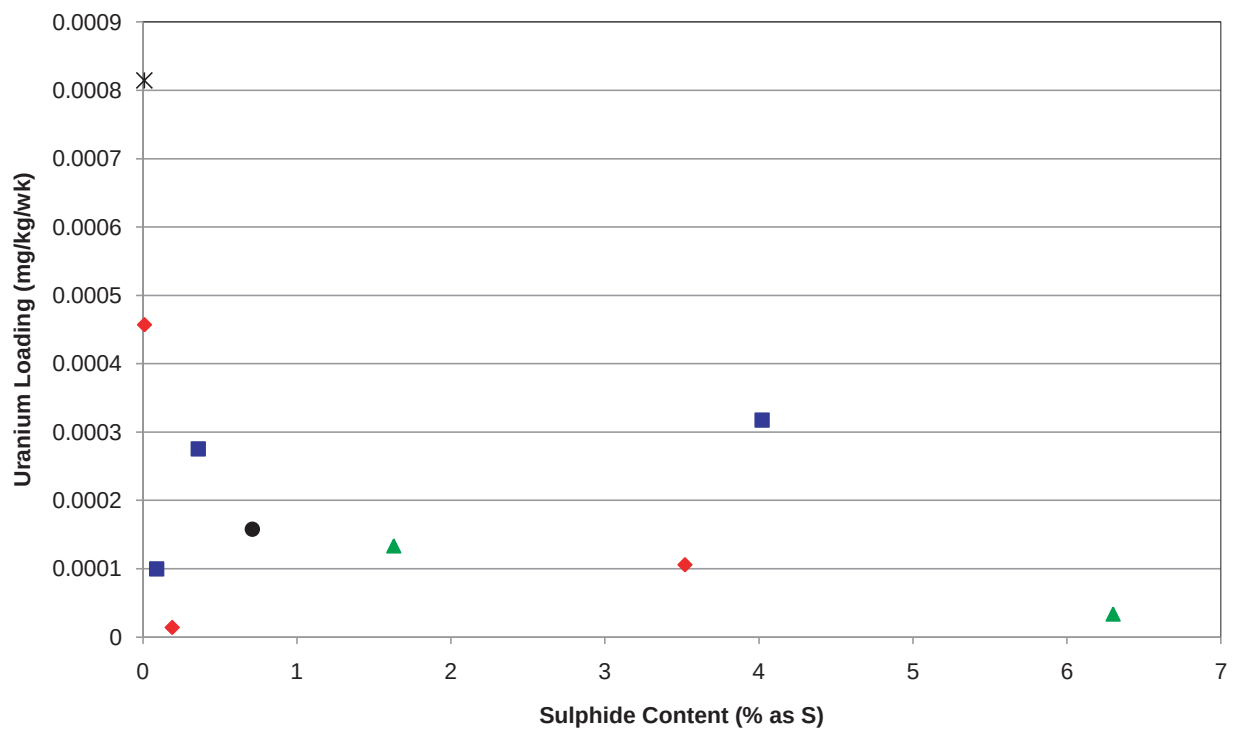


Figure 4.19







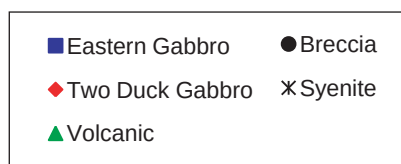
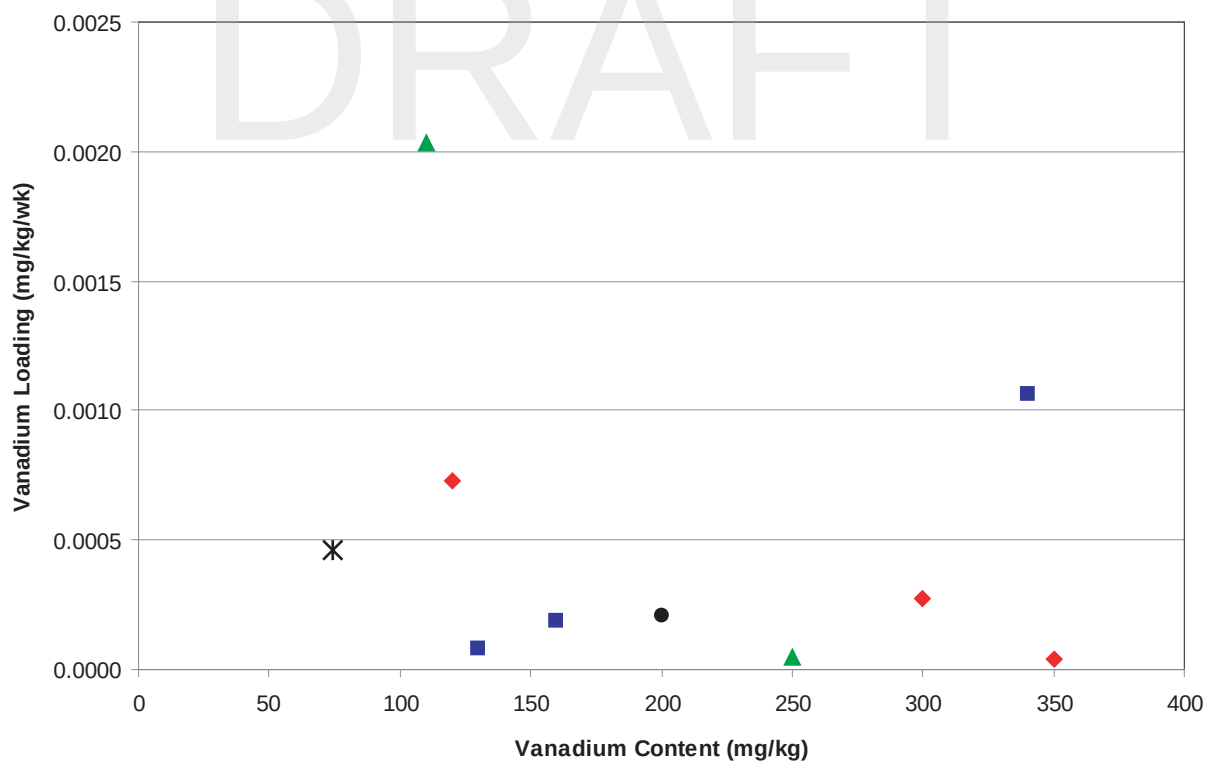
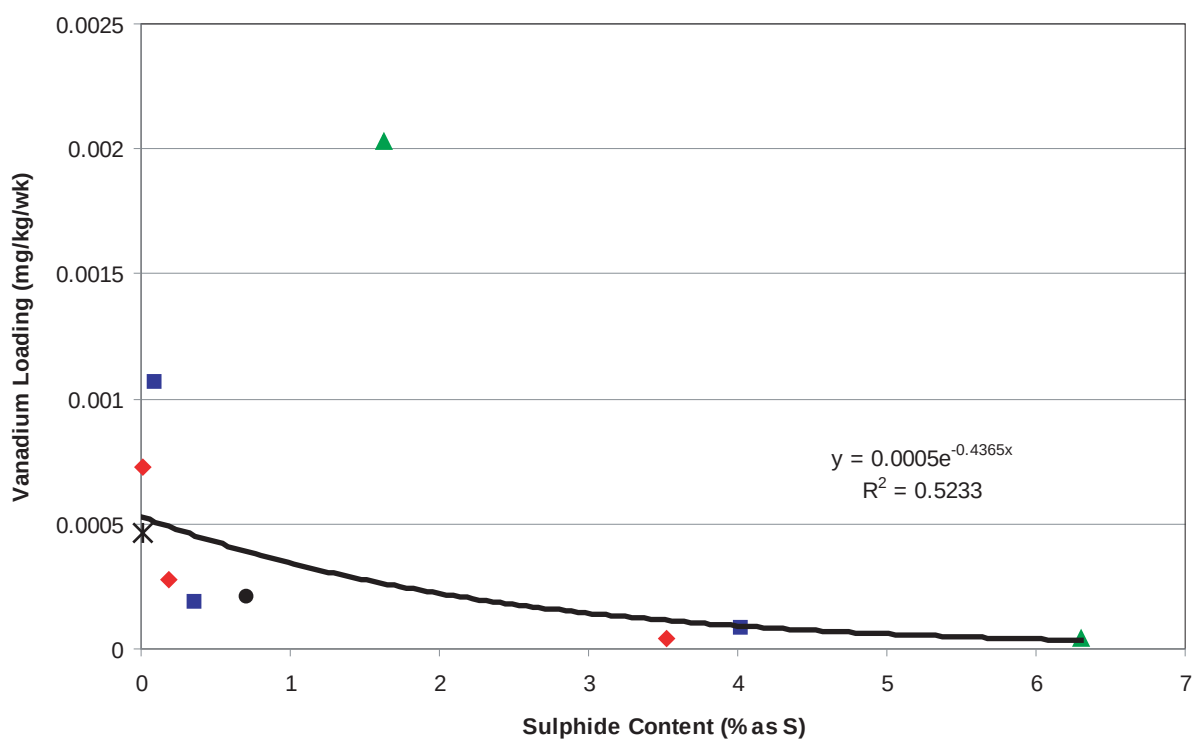


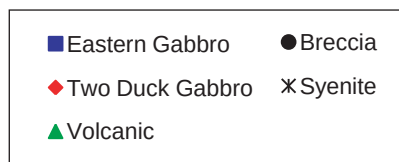
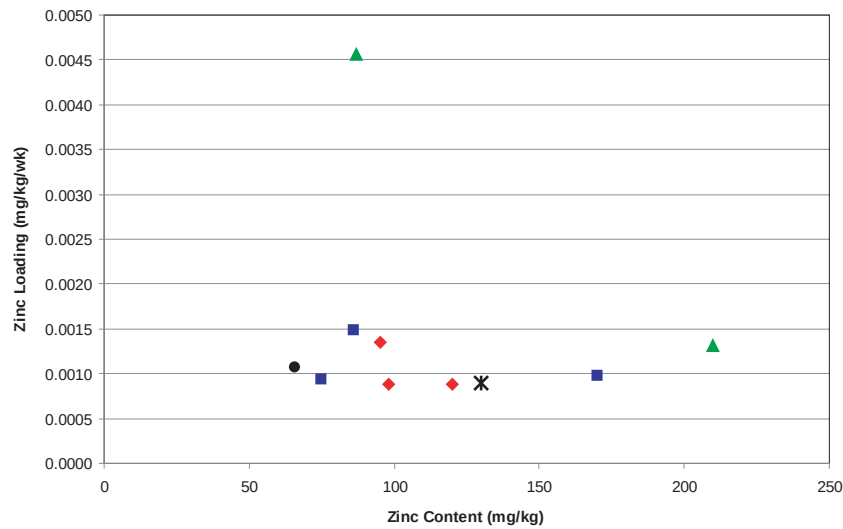
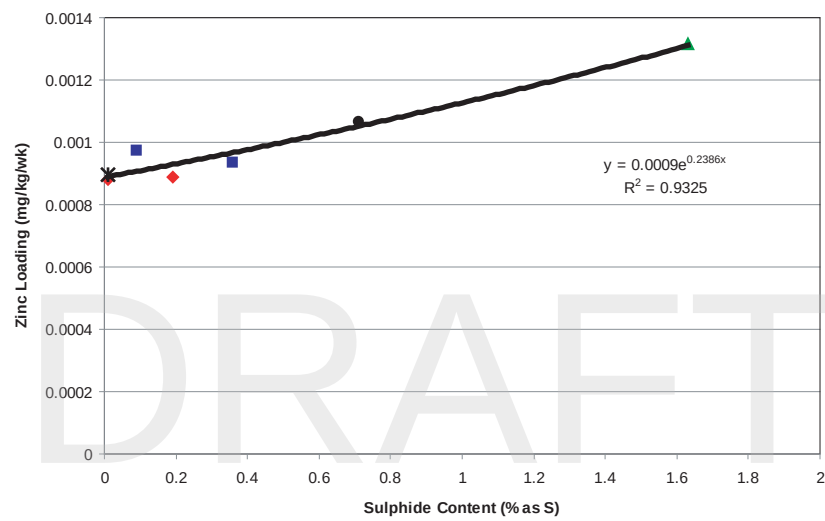
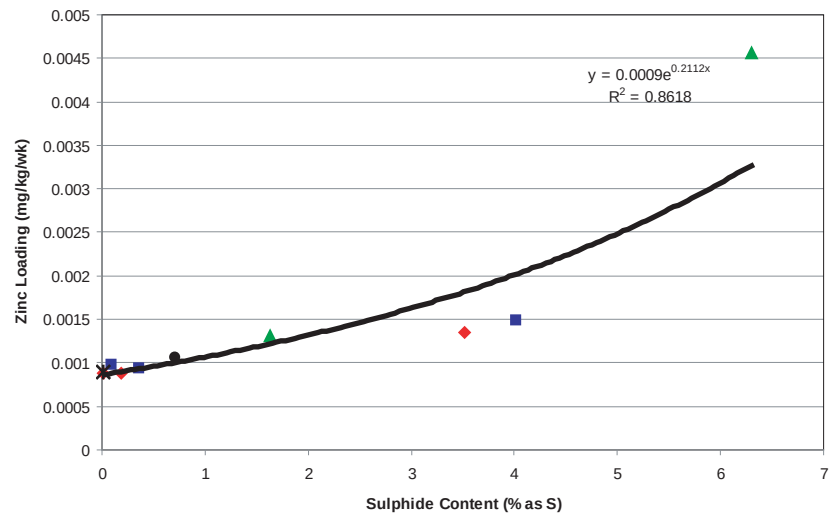
Marathon PGM

Calculated Loading Rate for Uranium from Mine Rock
Humidity Cell Tests



Figure 4.23





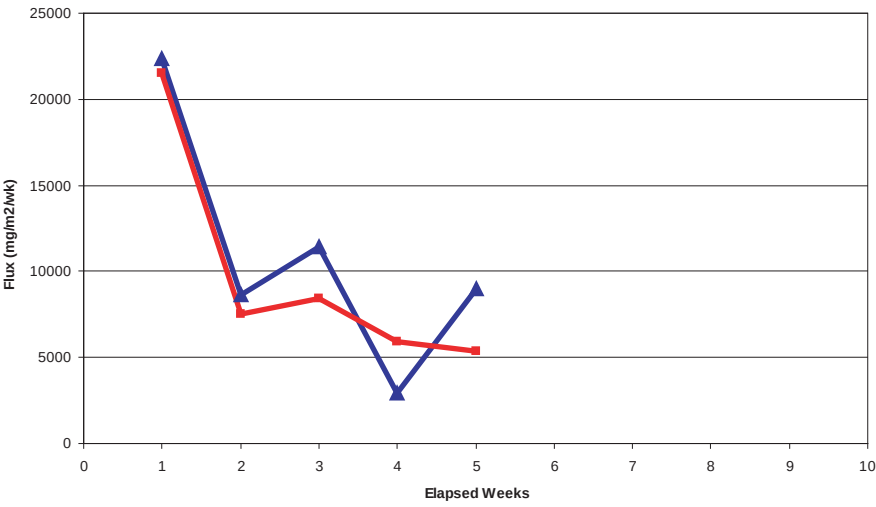
Marathon PGM

Calculated Loading Rate for Zinc from Mine Rock
Humidity Cell Tests

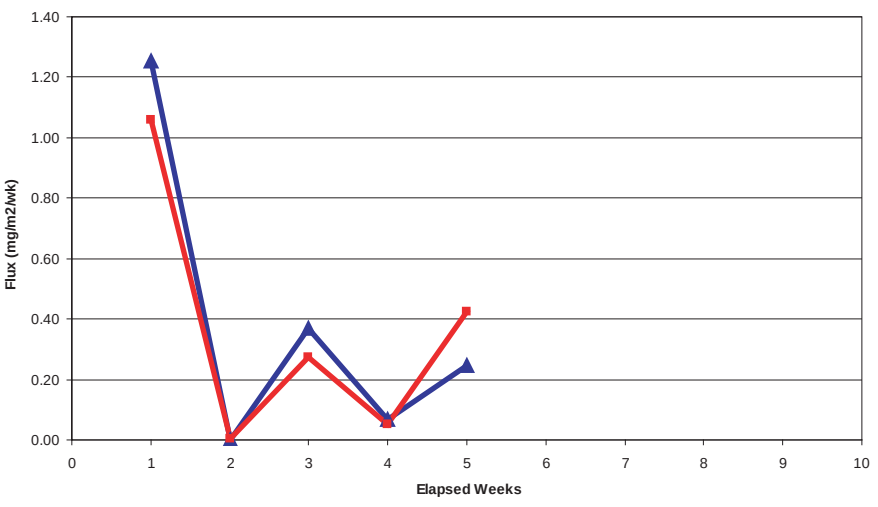


Figure 4.25

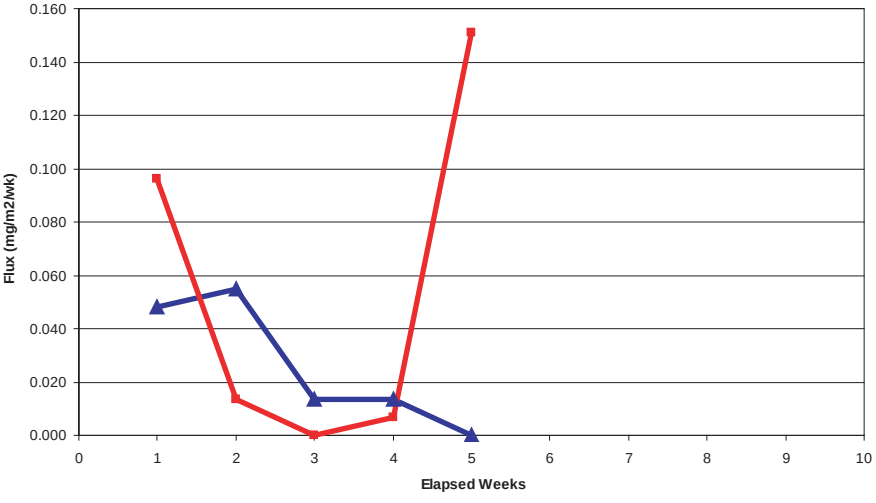
Sulphate



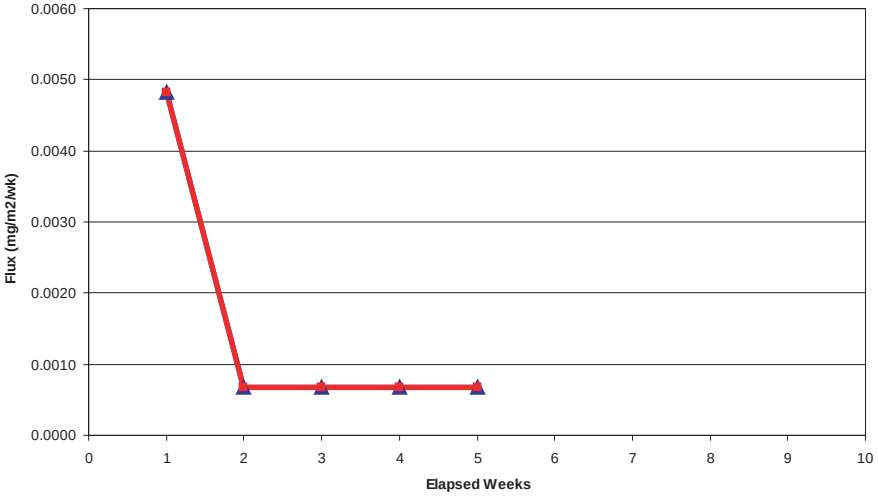
Aluminum



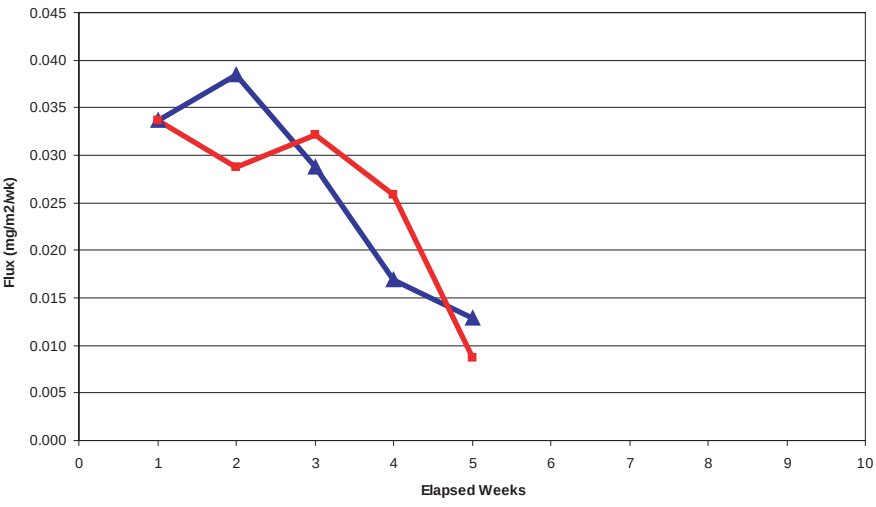
Arsenic



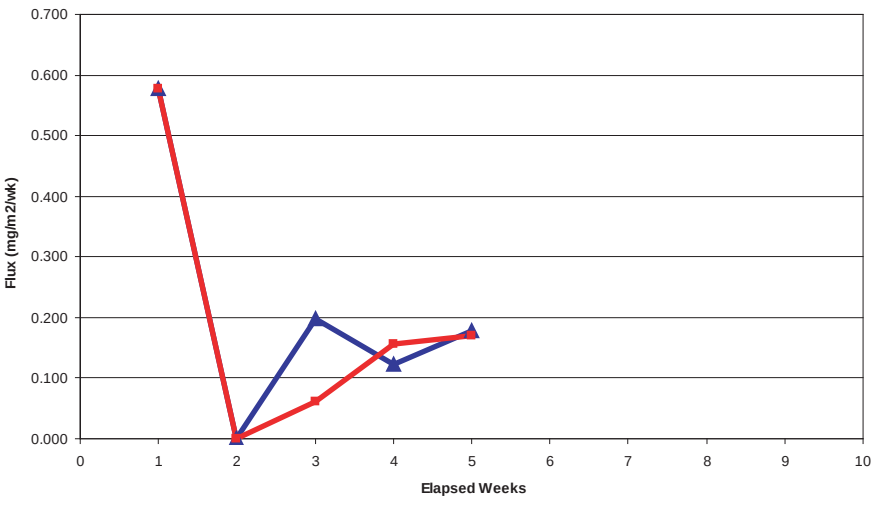
Cadmium



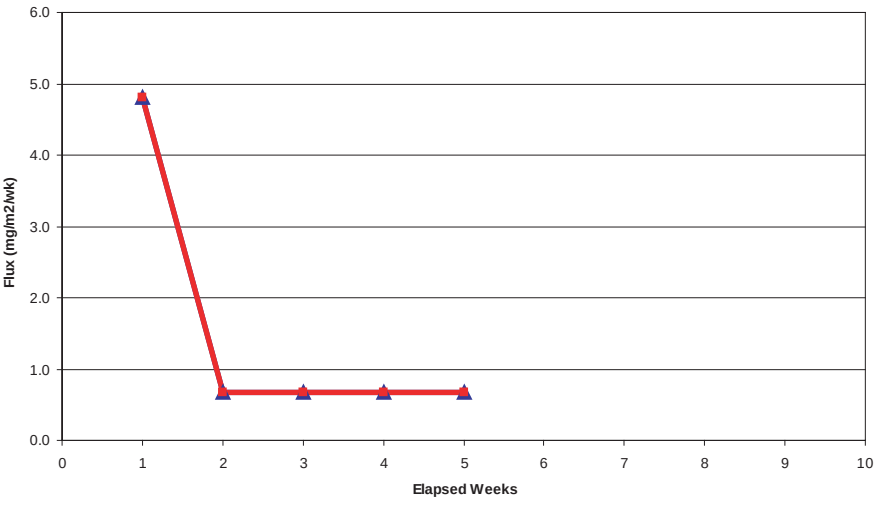
Cobalt



Copper

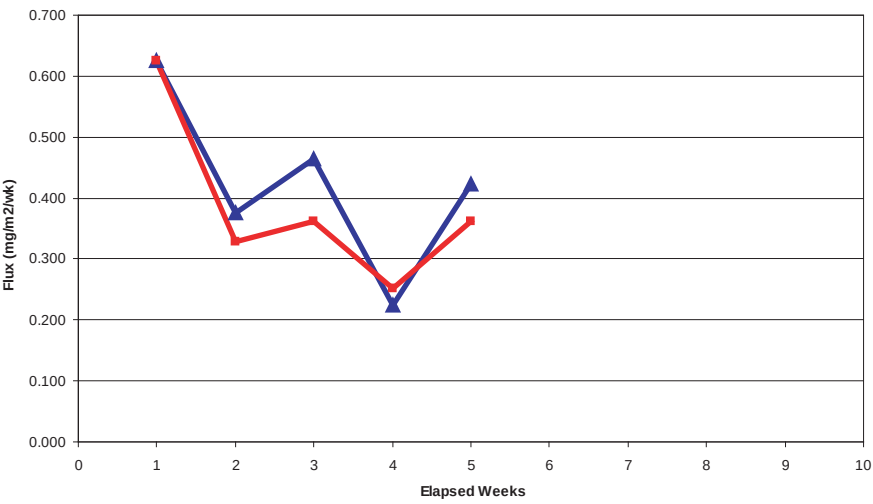


Iron

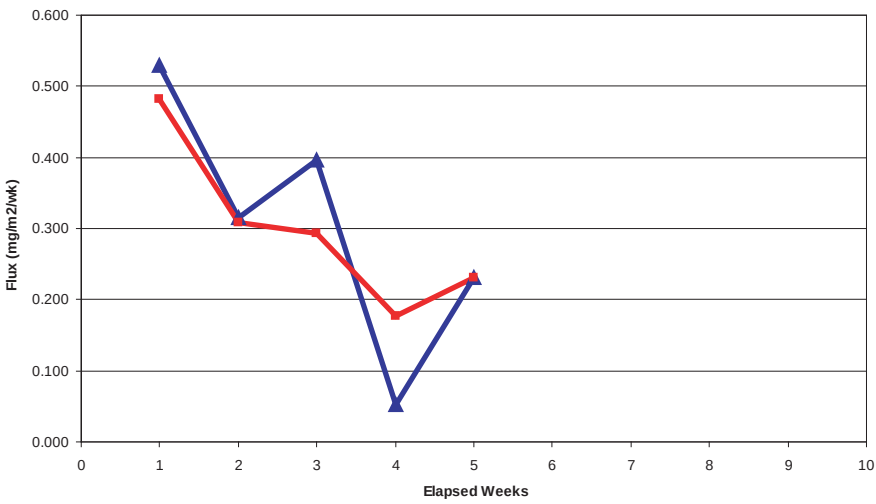


Column 1
Column 2

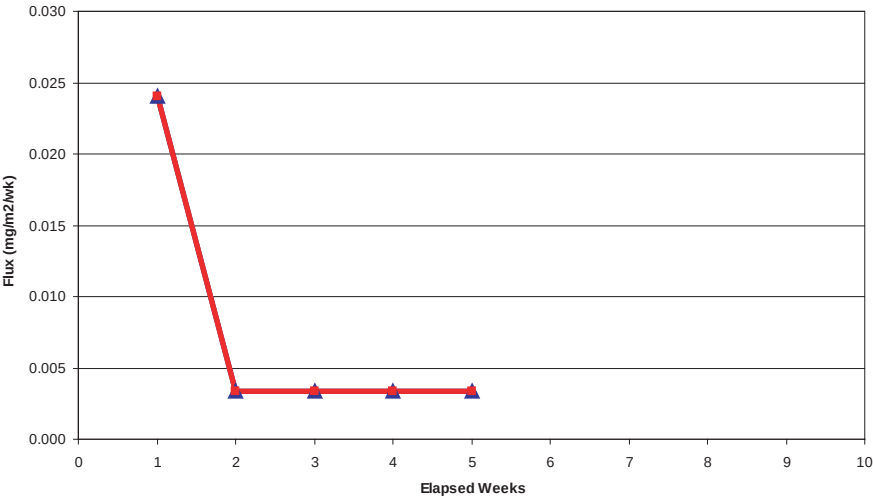
Molybdenum



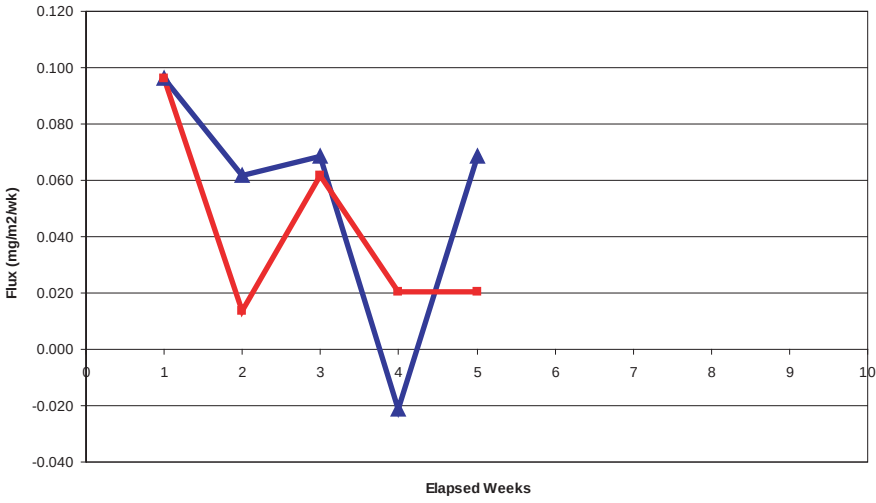
Nickel



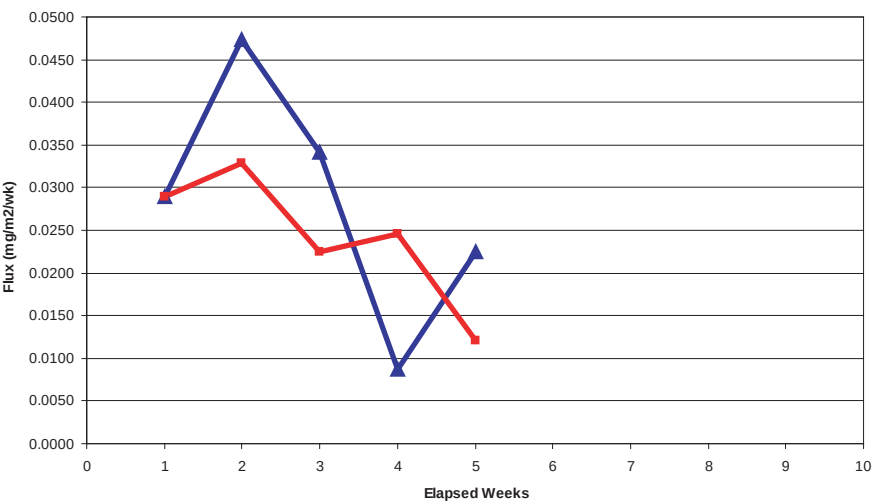
Lead



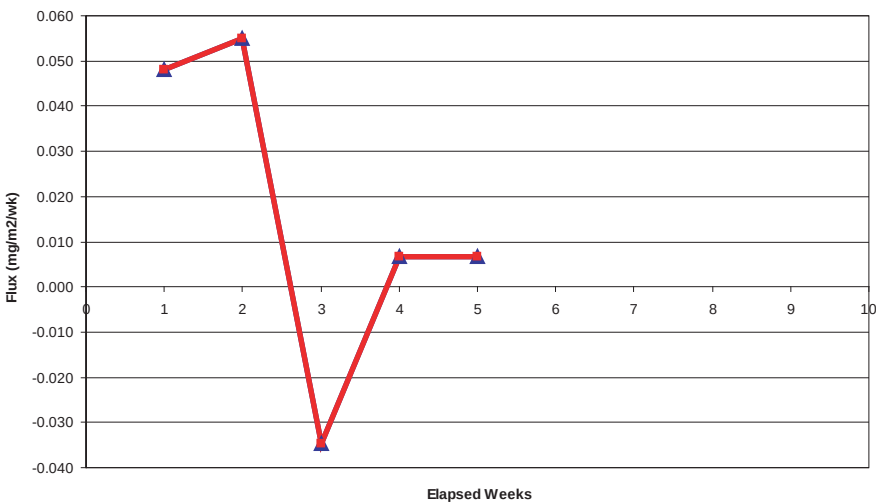
Selenium



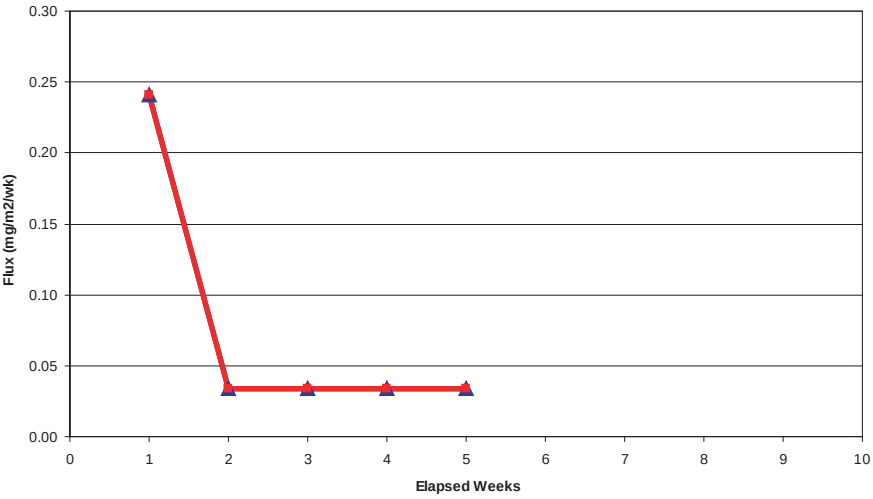
Uranium



Vanadium

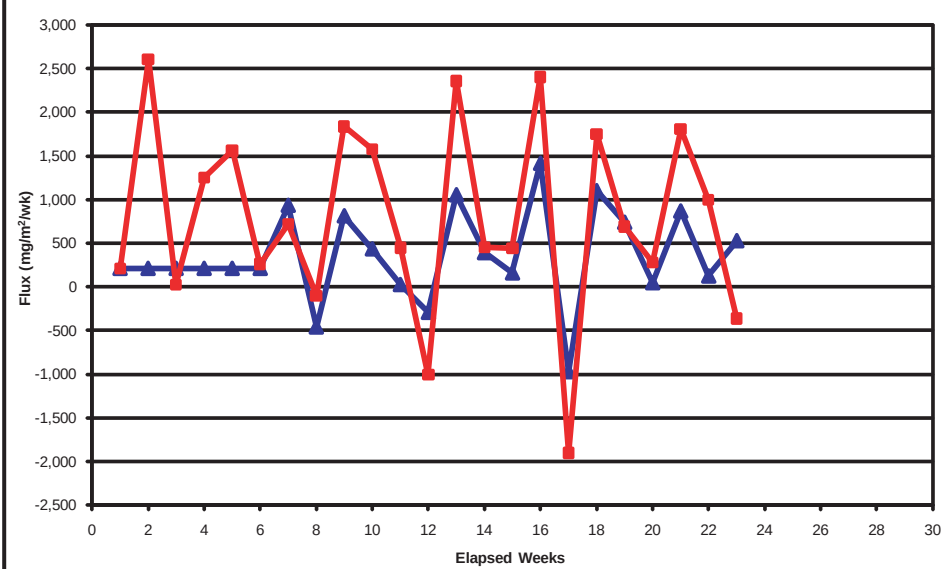


Zinc

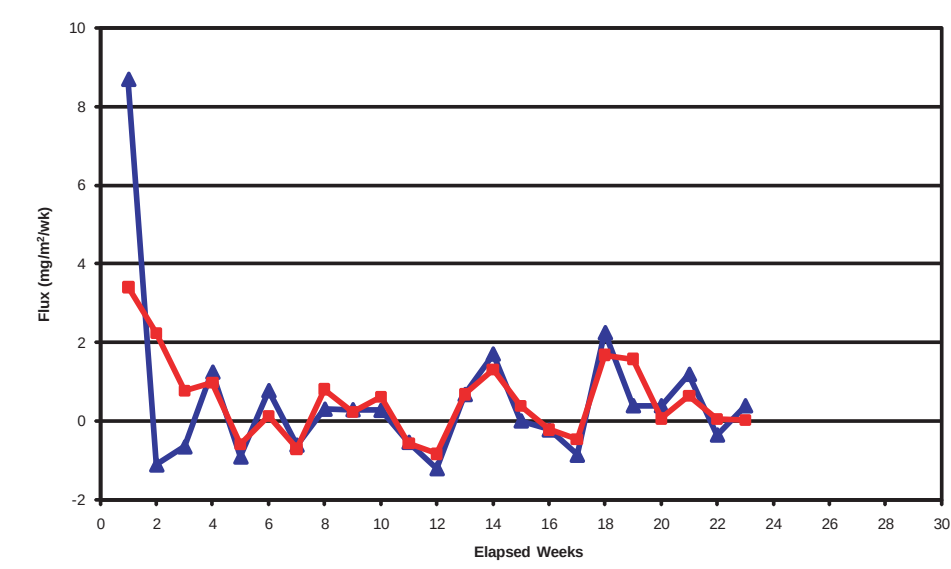


Column 1
Column 2

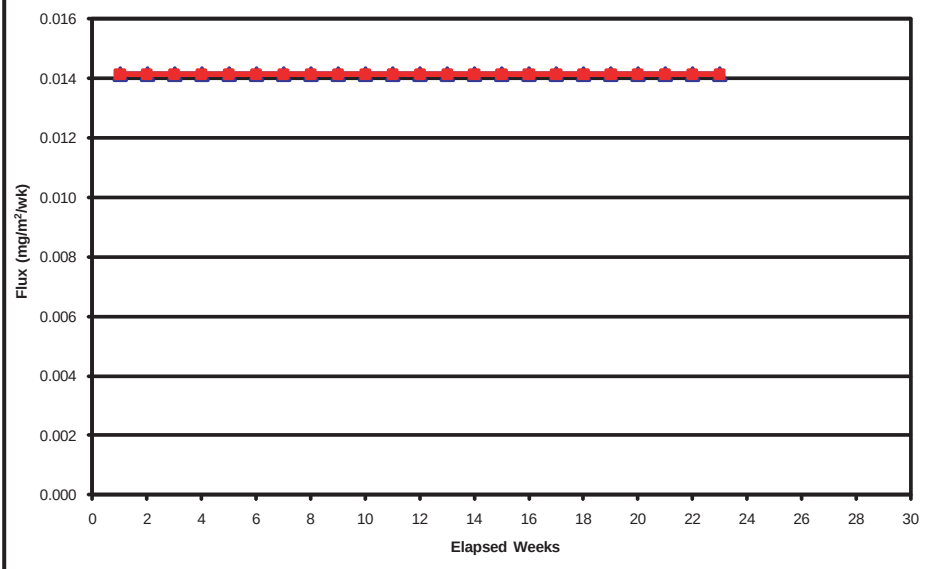
Sulphate



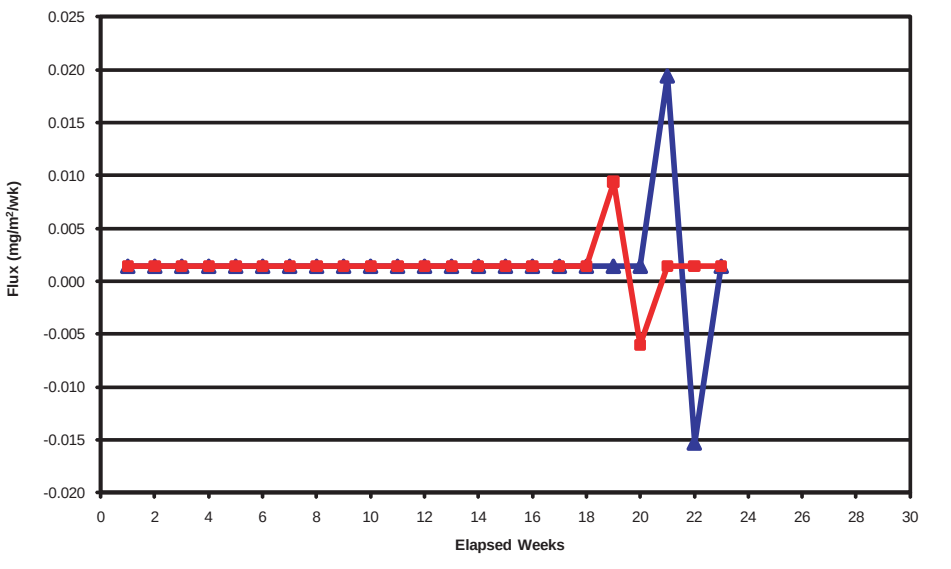
Aluminum



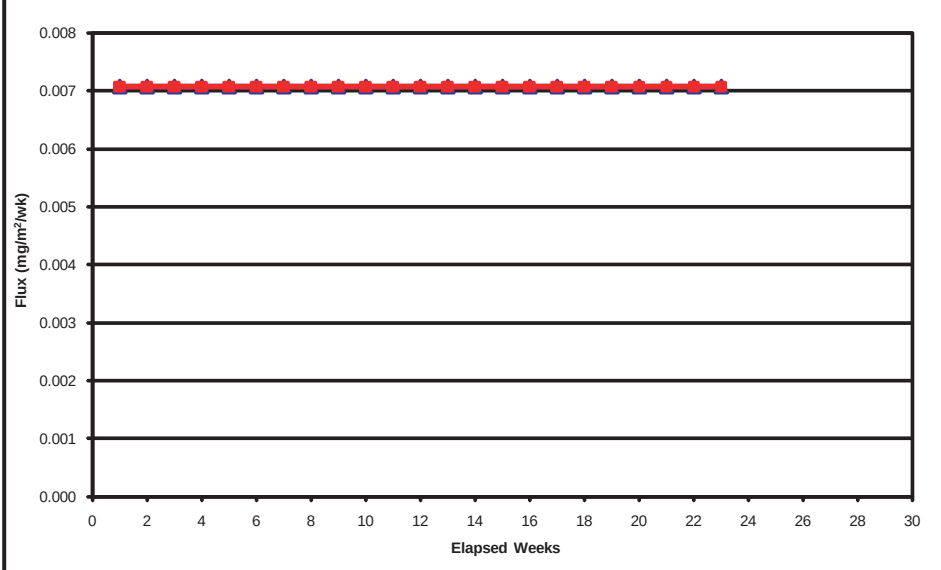
Arsenic



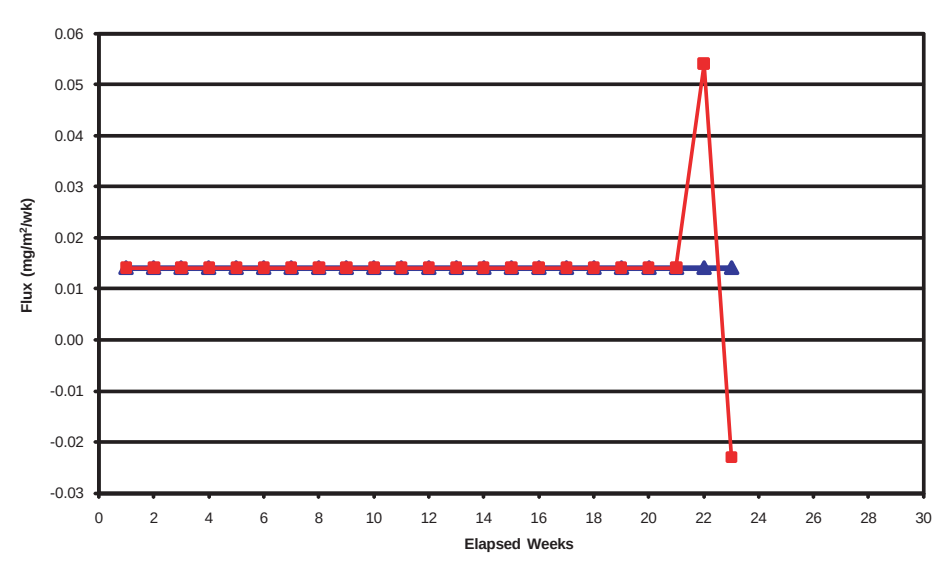
Cadmium



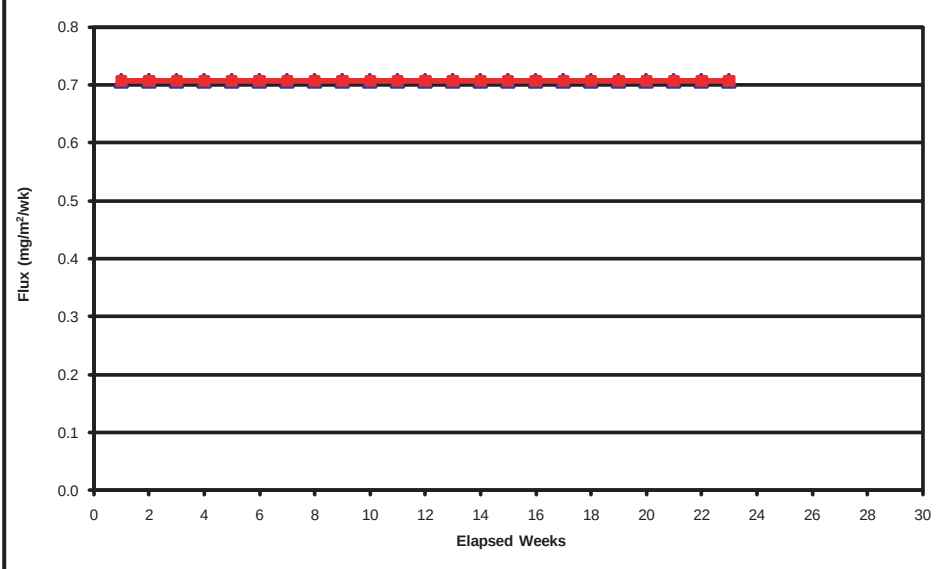
Cobalt



Copper

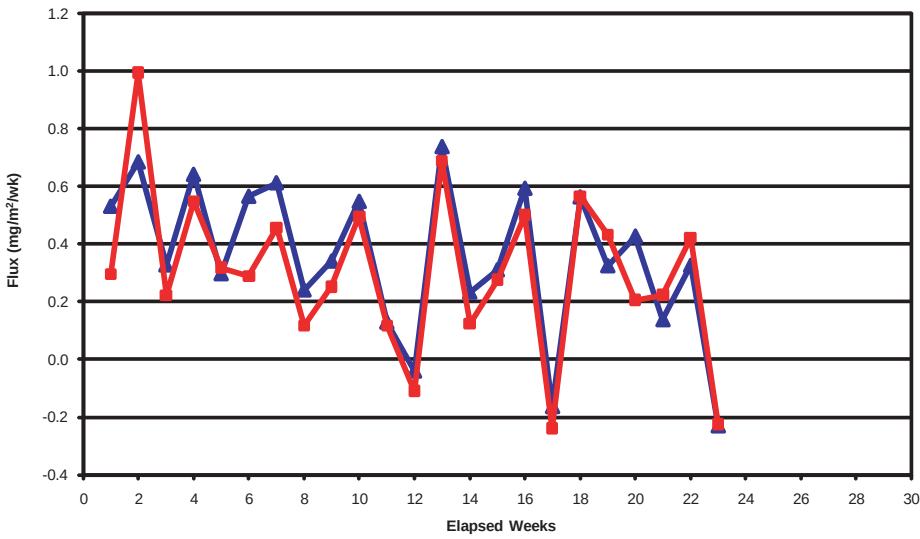


Iron

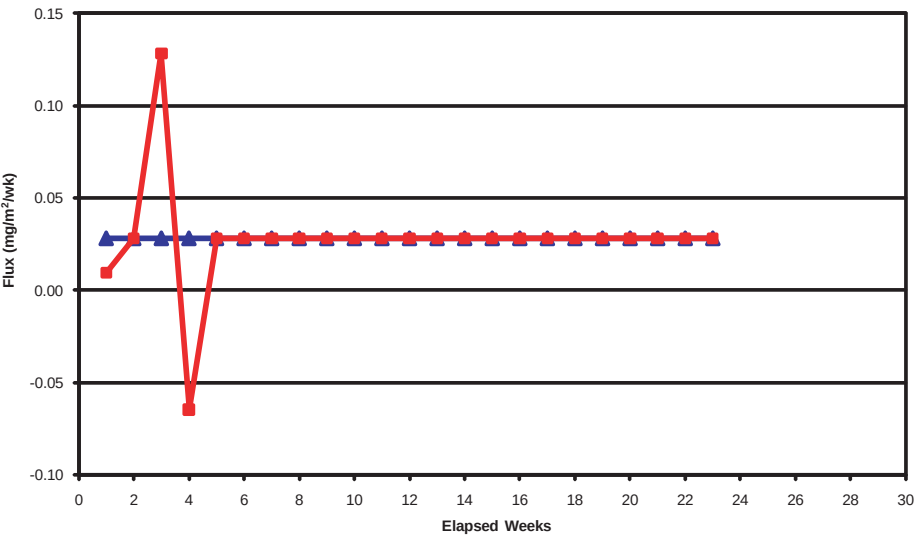


▲ Column 1
■ Column 2

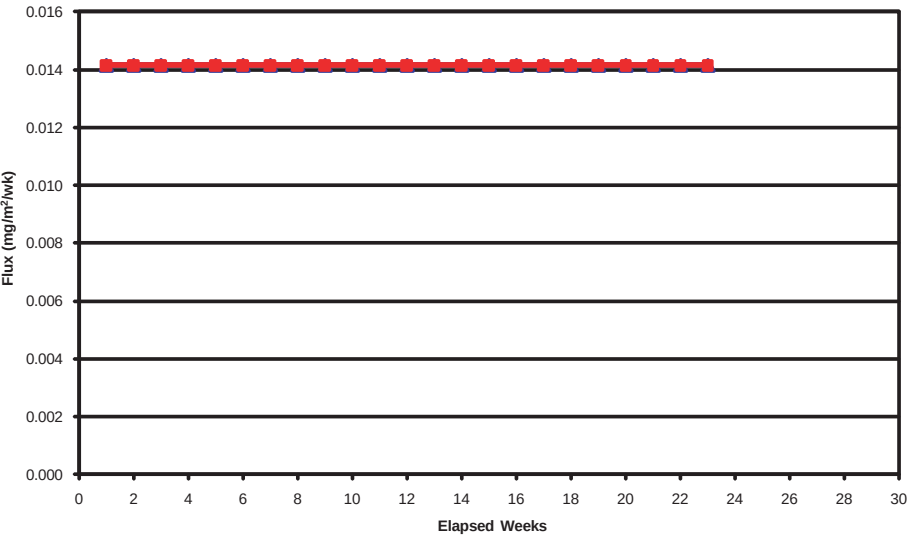
Molybdenum



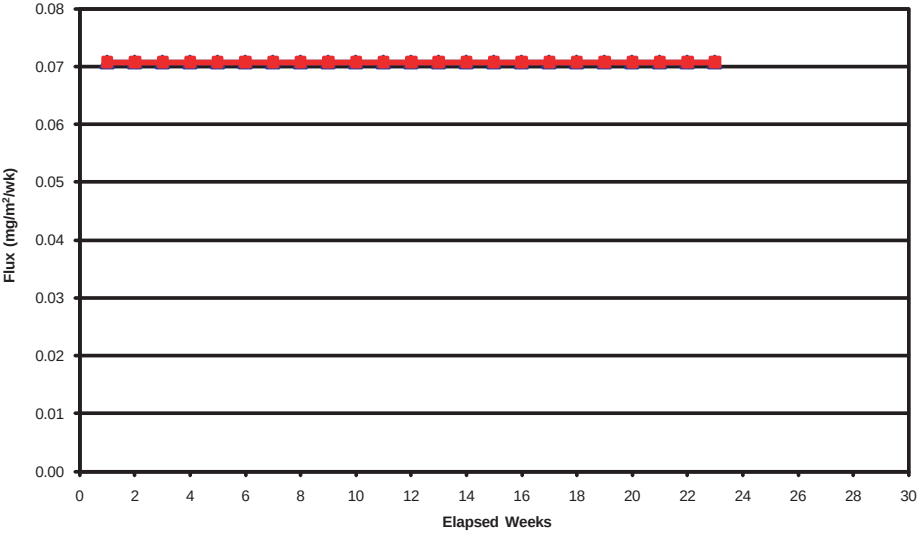
Nickel



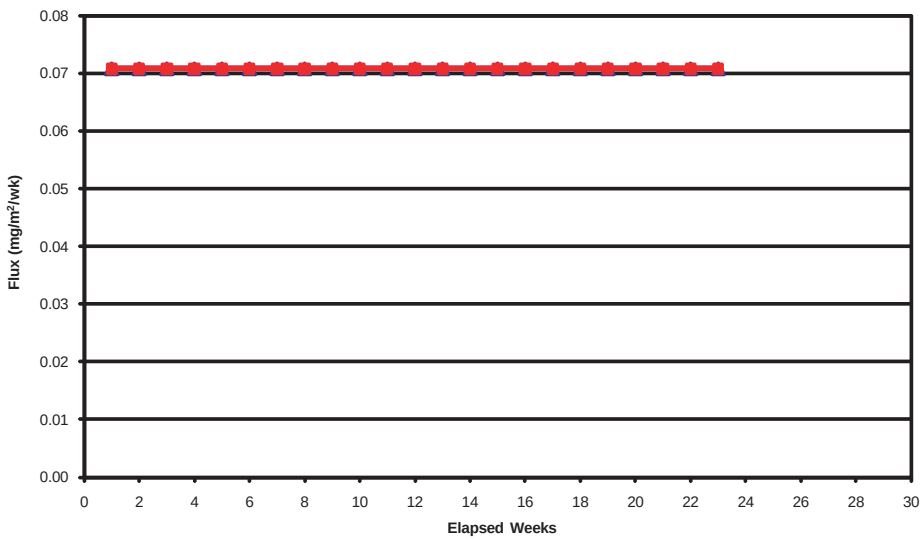
Lead



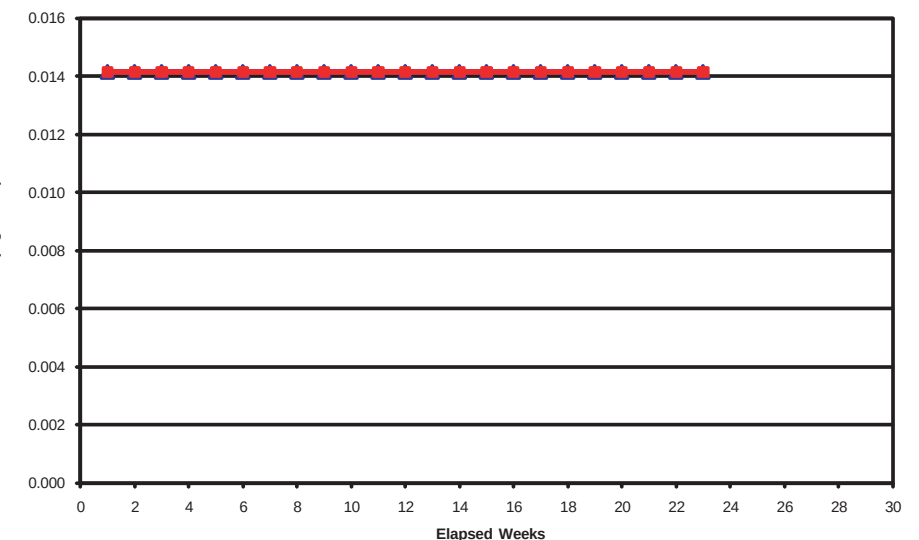
Selenium



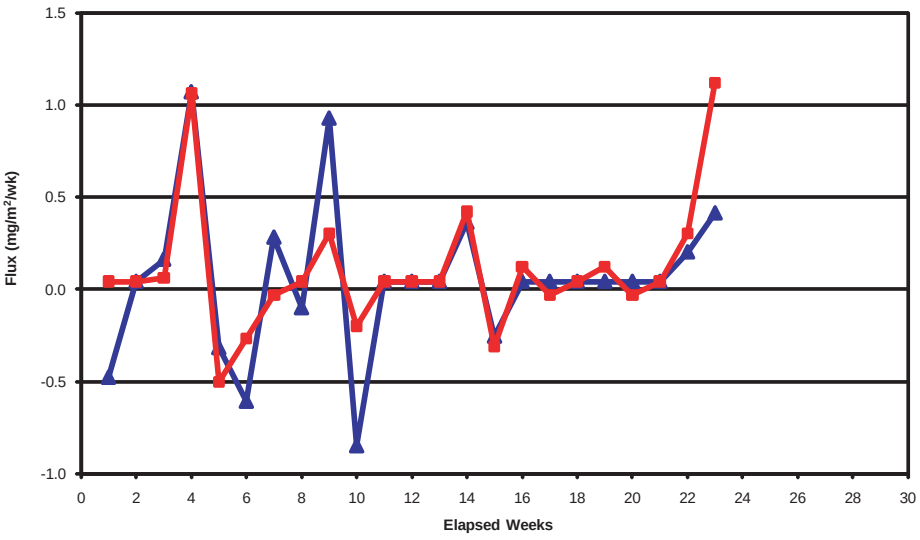
Uranium



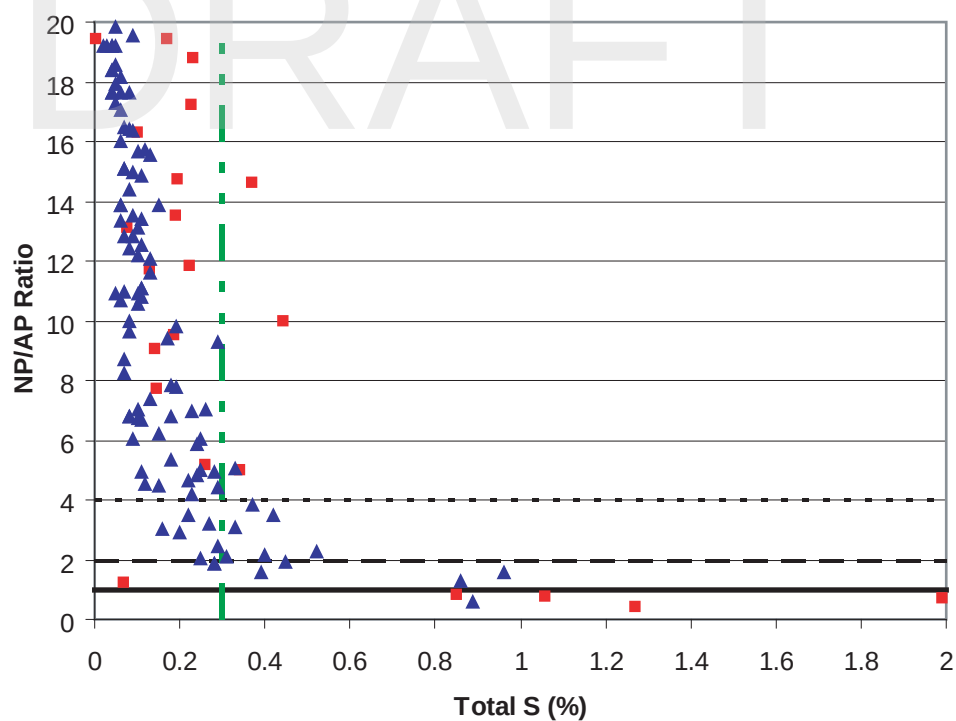
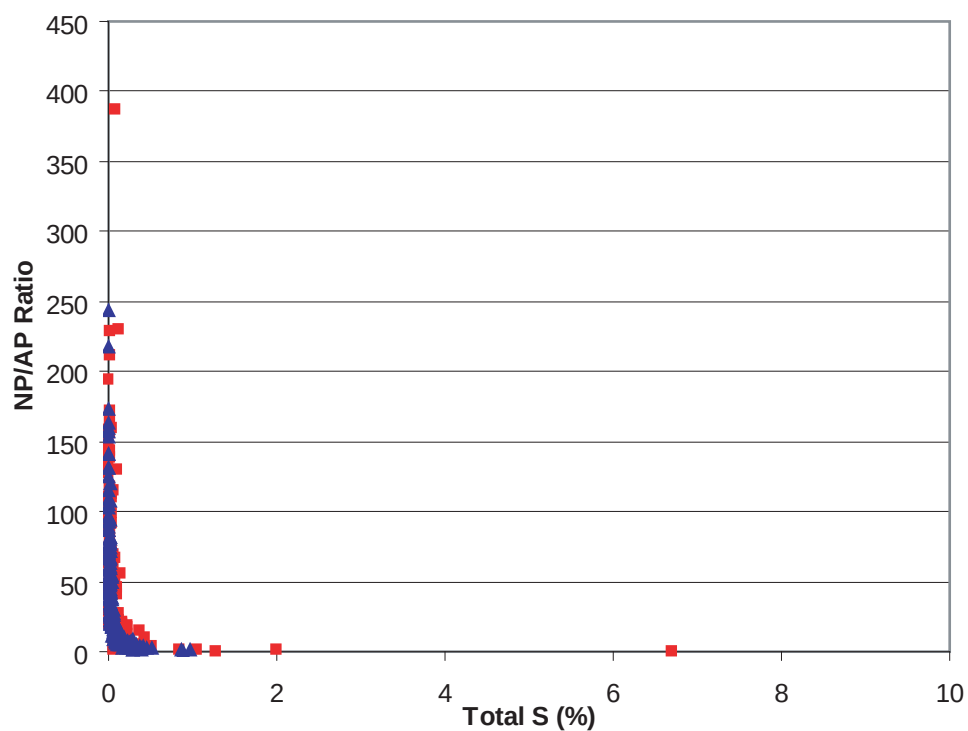
Vanadium



Zinc



Column 1
Column 2



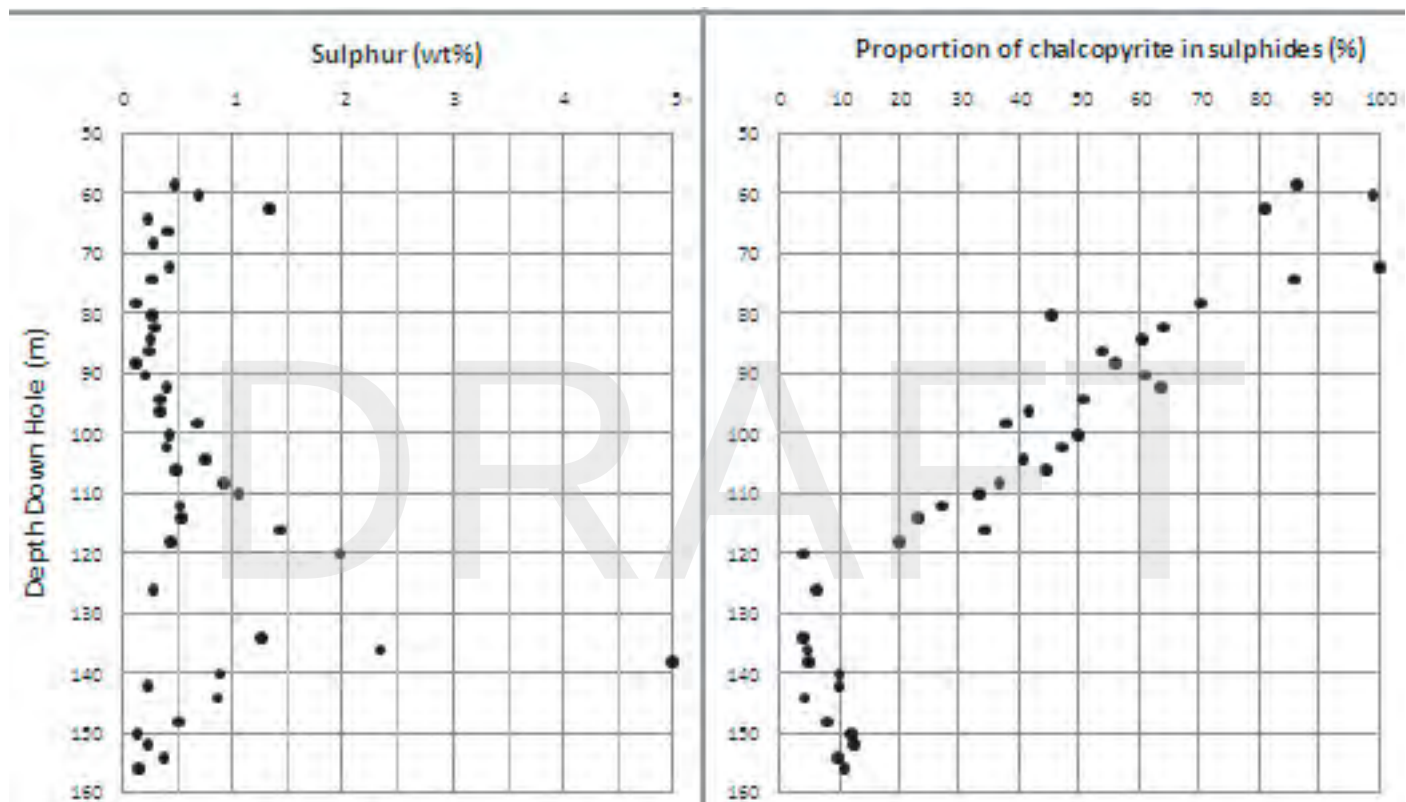
- 2007 ABA Data
- ▲ 2010 ABA Data
- NP/AP = 1
- - NP/AP = 2
- . - . NP/AP = 4
- Total S = 0.3%

Marathon PGM

Correlation Between Total Sulphur and
NP/AP Ratio in Mine Rock



Figure 4.28



Marathon PGM

Sulfur and Percentage Chalcopyrite with Depth

APPENDIX 1

Compilation of Solids Data for Mine Rock and Process Solids

**Summary of ABA and Bulk Metal Content Results from 2010 Mine
Rock Samples**

Summary of ABA Results from 2010 Mine Rock Samples

SAMPLE ID	Core	From	To	pH	NP	AP	NNP	NP/AP	Total S	Sulphide S	Sulphate S	C	Carb-NP	CO2
-	-	m	m	Unity	kg CaCO3/t	kg CaCO3/t	kg CaCO3/t	Unity	%	%	%	%	kg CaCO3/t	%
638051	M-07-412	3	13	9.3	37	0.6	36	59.2	0.02	0.02	0.01	0.11	9.17	0.4
638052	M-07-412	13	23	NA	28	0.6	27	44.8	0.02	NA	NA	NA	NA	NA
638053	M-07-412	23	33	9.5	38	1.6	36	24.32	0.05	0.04	0.04	0.12	10.00	0.5
638054	M-07-412	33	43	NA	34	1.3	33	27.2	0.04	NA	NA	NA	NA	NA
638055	M-07-412	43	53	9.2	38	3.1	35	12.16	0.1	0.08	0.02	0.19	15.83	0.7
638056	M-07-412	53	63	9.4	37	1.6	35	23.68	0.05	0.04	0.04	0.13	10.83	0.5
638057	M-07-412	63	73	NA	50	0.6	49	80	0.02	NA	NA	NA	NA	NA
638058	M-07-412	143	159	9.3	17	1.6	15	10.88	0.05	0.04	<0.01	0.05	4.17	0.2
638059	M-07-349	4	14	NA	36	2.5	34	14.4	0.08	NA	NA	NA	NA	NA
638060	M-07-349	14	24	9	19	2.2	17	8.69	0.07	0.01	0.01	0.13	10.83	0.5
638061	M-07-349	24	34	NA	28	2.2	26	12.8	0.07	NA	NA	NA	NA	NA
638062	M-07-349	34	44	9.1	35	0.9	34	37.33	0.03	0.02	0.02	0.18	15.00	0.7
638063	M-07-349	44	54	9.1	23	3.4	20	6.69	0.11	0.09	0.04	0.08	6.67	0.3
638064	M-07-349	54	64	8.8	32	1.9	30	17.07	0.06	0.04	0.01	0.2	16.67	0.7
638065	M-07-349	64	74	9.1	28	1.3	27	22.4	0.04	0.02	0.05	0.18	15.00	0.7
638066	M-07-352	8	18	NA	27	0.3	27	86.4	0.01	NA	NA	NA	NA	NA
638067	M-07-352	18	28	9.6	27	0.3	27	86.4	0.01	0.01	<0.01	0.07	5.83	0.3
638068	M-07-352	28	38	9.7	29	0.3	29	92.8	0.01	0.01	<0.01	<0.05	4.17	<0.2
638069	M-07-352	38	48	9.7	28	0.3	28	89.6	0.01	0.01	0.01	<0.05	4.17	<0.2
638070	M-07-352	48	58	9.7	22	0.3	22	70.4	0.01	0.01	<0.01	<0.05	4.17	<0.2
638071	M-07-352	58	68	9.6	26	0.6	25	41.6	0.02	0.01	<0.01	<0.05	4.17	<0.2
638072	M-07-352	68	78	9.5	55	1.9	53	29.33	0.06	0.07	<0.01	0.06	5.00	0.2
638073	M-07-417	10	20	9.6	18	0.3	18	57.6	0.01	0.01	<0.01	0.05	4.17	0.2
638074	M-07-417	20	30	9.4	24	0.6	23	38.4	0.02	0.01	0.01	0.06	5.00	0.2
638075	M-07-417	30	40	NA	37	3.4	34	10.76	0.11	NA	NA	NA	NA	NA
638076	M-07-417	40	50	9.7	14	0.3	14	44.8	0.01	0.01	<0.01	<0.05	4.17	<0.2
638077	M-07-417	50	60	9.8	13	0.3	13	41.6	0.01	<0.01	<0.01	<0.05	4.17	0.2
638078	M-07-417	60	70	9	35	1.6	33	22.4	0.05	0.05	0.01	0.25	20.83	0.9
638079	M-07-417	70	80	8.8	36	0.9	35	38.4	0.03	0.03	<0.01	0.34	28.34	1.3
638080	M-07-417	80	90	NA	32	0.6	31	51.2	0.02	NA	NA	NA	NA	NA
638081	M-07-417	90	100	8.2	32	0.6	31	51.2	0.02	0.01	0.01	<0.05	4.17	<0.2
638082	M-07-417	100	110	8.1	33	0.3	33	105.6	0.01	0.01	0.01	<0.05	4.17	<0.2
638083	M-07-417	110	120	8.1	51	0.6	50	81.6	0.02	0.02	0.01	0.06	5.00	0.2

NOTES:

NA = Not Analyzed

Summary of ABA Results from 2010 Mine Rock Samples

SAMPLE ID	Core	From	To	pH	NP	AP	NNP	NP/AP	Total S	Sulphide S	Sulphate S	C	Carb-NP	CO2
-	-	m	m	Unity	kg CaCO3/t	kg CaCO3/t	kg CaCO3/t	Unity	%	%	%	%	kg CaCO3/t	%
638084	M-07-417	120	130	8.4	42	0.6	41	67.2	0.02	0.01	0.03	0.39	32.50	1.4
638085	M-07-417	130	140	8.7	51	0.6	50	81.6	0.02	0.02	0.03	0.35	29.17	1.3
638086	M-07-417	140	150	9.2	39	0.9	38	41.6	0.03	0.03	0.02	0.16	13.33	0.6
638087	M-07-417	150	160	9.5	52	1.9	50	27.73	0.06	0.05	<0.01	0.12	10.00	0.4
638088	M-07-417	160	170	NA	30	0.9	29	32	0.03	NA	NA	NA	NA	NA
638089	M-07-417	170	180	9.4	67	1.3	66	53.6	0.04	0.03	<0.01	0.08	6.67	0.3
638090	M-07-417	180	190	9.1	65	4.7	60	13.87	0.15	0.14	<0.01	0.23	19.17	0.9
638091	M-09-483	5	15	9	51	3.4	48	14.84	0.11	0.09	<0.01	0.12	10.00	0.4
638092	M-09-483	29	39	9.7	26	0.6	25	41.6	0.02	0.03	<0.01	<0.05	4.17	<0.2
638093	M-09-483	39	49	9.5	24	1.3	23	19.2	0.04	0.03	<0.01	<0.05	4.17	<0.2
638094	M-09-483	49	59	9.2	21	0.9	20	22.4	0.03	0.02	<0.01	0.05	4.17	0.2
638095	M-09-483	59	69	9.2	48	1.9	46	25.6	0.06	0.04	0.01	0.17	14.17	0.6
638096	M-09-482	1	11	8.9	45	0.6	44	72	0.02	0.01	<0.01	0.07	5.83	0.3
638097	M-09-482	23	33	9.4	26	1.3	25	20.8	0.04	0.02	<0.01	<0.05	4.17	<0.2
638098	M-09-482	33	43	9.4	24	2.2	22	10.97	0.07	0.05	0.01	<0.05	4.17	<0.2
638099	M-09-482	69	79	9.4	44	2.5	42	17.6	0.08	0.07	0.01	0.13	10.83	0.5
638100	M-09-482	79	89	NA	44	2.2	42	20.11	0.07	NA	NA	NA	NA	NA
638101	M-09-482	89	99	8.8	31	1.6	29	19.84	0.05	0.03	<0.01	0.11	9.17	0.4
638102	M-09-482	99	111	9	32	6.9	25	4.65	0.22	0.19	<0.01	0.07	5.83	0.3
638103	M-09-481	5	15	9.1	22	1.3	21	17.6	0.04	0.03	<0.01	<0.05	4.17	0.2
638104	M-09-481	15	25	9.4	16	0.6	15	25.6	0.02	0.02	<0.01	<0.05	4.17	0.2
638105	M-09-481	77	87	9	30	7.2	23	4.17	0.23	0.21	<0.01	0.08	6.67	0.3
638106	M-04-06	5	15	9.3	43	8.8	34	4.91	0.28	0.24	0.01	0.08	6.67	0.3
638107	M-04-06	15	25	9.3	19	12.2	7	1.56	0.39	0.33	<0.01	<0.05	4.17	<0.2
638108	M-04-15	5	15	NA	50	7.2	43	6.96	0.23	NA	NA	NA	NA	NA
638109	M-04-15	15	25	8.7	52	10.3	42	5.04	0.33	0.31	<0.01	0.23	19.17	0.8
638110	M-04-15	25	35	8.2	47	30	17	1.57	0.96	0.84	0.02	0.19	15.83	0.7
638111	M-04-15	35	45	9	39	1.3	38	31.2	0.04	0.03	<0.01	0.17	14.17	0.6
638112	M-04-16	6	16	8.2	38	5.6	32	6.76	0.18	0.14	<0.01	0.17	14.17	0.6
638113	M-04-16	16	26	8.4	59	3.8	55	15.73	0.12	0.11	<0.01	0.32	26.67	1.2
638114	M-04-30	4	14	9.2	68	1.3	67	54.4	0.04	0.04	0.03	0.11	9.17	0.4
638115	M-04-30	14	24	8.9	45	1.9	43	24	0.06	0.05	0.03	0.09	7.50	0.3
638116	M-04-30	28	42	9.1	45	0.9	44	48	0.03	0.02	0.03	0.23	19.17	0.8

NOTES:

NA = Not Analyzed

Summary of ABA Results from 2010 Mine Rock Samples

SAMPLE ID	Core	From	To	pH	NP	AP	NNP	NP/AP	Total S	Sulphide S	Sulphate S	C	Carb-NP	CO2
-	-	m	m	Unity	kg CaCO3/t	kg CaCO3/t	kg CaCO3/t	Unity	%	%	%	%	kg CaCO3/t	%
638117	M-04-30	60	70	9.1	43	1.6	41	27.52	0.05	0.03	0.01	0.22	18.33	0.8
638118	M-04-30	70	80	9.2	36	2.8	33	12.8	0.09	0.07	<0.01	0.12	10.00	0.4
638119	M-04-30	80	90	9	42	2.8	39	14.93	0.09	0.05	<0.01	0.14	11.67	0.5
638120	M-06-202	9	19	9.4	54	0.3	54	172.8	0.01	0.01	<0.01	0.15	12.50	0.5
638121	M-06-202	19	29	9.4	50	0.9	49	53.33	0.03	0.02	<0.01	0.14	11.67	0.5
638122	M-06-202	29	39	9.6	29	0.3	29	92.8	0.01	0.01	<0.01	0.13	10.83	0.5
638123	M-06-202	39	49	9.7	16	0.3	16	51.2	0.01	<0.01	<0.01	0.13	10.83	0.5
638124	M-06-202	49	59	9.6	48	0.3	48	153.6	0.01	0.01	<0.01	0.17	14.17	0.6
638125	M-06-202	59	69	9.5	32	0.6	31	51.2	0.02	0.02	<0.01	0.14	11.67	0.5
638126	M-06-202	69	79	NA	30	0.6	29	48	0.02	NA	NA	NA	NA	NA
638127	M-06-202	79	89	8.7	29	0.3	29	92.8	0.01	0.01	<0.01	<0.05	4.17	0.2
638128	M-06-202	89	99	9.6	38	0.6	37	60.8	0.02	<0.01	<0.01	0.05	4.17	0.2
638129	M-06-202	99	109	8.9	34	0.6	33	54.4	0.02	0.01	<0.01	<0.05	4.17	<0.2
638130	M-06-202	109	119	8.7	16	8.8	7	1.83	0.28	0.21	<0.01	0.15	12.50	0.5
638131	M-06-202	119	129	NA	28	1.6	26	17.92	0.05	NA	NA	NA	NA	NA
638132	M-06-202	129	139	9.4	39	0.9	38	41.6	0.03	0.02	<0.01	0.17	14.17	0.6
638133	M-06-202	139	149	9.4	24	0.9	23	25.6	0.03	0.01	<0.01	0.05	4.17	0.2
638134	M-06-202	149	159	9.5	47	1.3	46	37.6	0.04	0.03	<0.01	0.11	9.17	0.4
638135	M-06-202	159	169	9.5	46	5.9	40	7.75	0.19	0.17	<0.01	0.12	10.00	0.5
638136	M-06-202	169	179	NA	47	1.6	45	30.08	0.05	NA	NA	NA	NA	NA
638137	M-06-202	179	189	9.2	58	5.9	52	9.77	0.19	0.16	<0.01	0.13	10.83	0.5
638138	M-06-208	2	12	NA	36	0.9	35	38.4	0.03	NA	NA	NA	NA	NA
638139	M-06-208	12	22	9.5	33	0.6	32	52.8	0.02	0.01	0.01	0.09	7.50	0.3
638140	M-06-208	22	32	9.3	19	0.3	19	60.8	0.01	0.01	<0.01	0.05	4.17	0.2
638141	M-06-208	32	42	9.7	29	0.9	28	30.93	0.03	0.02	0.02	0.06	5.00	0.2
638142	M-06-208	42	52	NA	29	0.6	28	46.4	0.02	NA	NA	NA	NA	NA
638143	M-06-208	52	62	9.6	26	0.6	25	41.6	0.02	0.01	<0.01	0.06	5.00	0.2
638144	M-06-208	62	72	9.3	19	0.9	18	20.27	0.03	0.02	<0.01	<0.05	4.17	0.2
638145	M-06-208	72	82	9.3	49	4.1	45	12.06	0.13	0.09	<0.01	0.12	10.00	0.4
638146	M-06-208	82	92	NA	20	0.9	19	21.33	0.03	NA	NA	NA	NA	NA
638147	M-06-208	148	158	NA	22	9.1	13	2.43	0.29	NA	NA	NA	NA	NA
638148	M-06-208	158	168	9.6	16	8.8	7	1.83	0.28	0.24	<0.01	0.06	5.00	0.2
638149	M-06-221	6	16	NA	26	0.6	25	41.6	0.02	NA	NA	NA	NA	NA

NOTES:

NA = Not Analyzed

Summary of ABA Results from 2010 Mine Rock Samples

SAMPLE ID	Core	From	To	pH	NP	AP	NNP	NP/AP	Total S	Sulphide S	Sulphate S	C	Carb-NP	CO2
-	-	m	m	Unity	kg CaCO3/t	kg CaCO3/t	kg CaCO3/t	Unity	%	%	%	%	kg CaCO3/t	%
638150	M-06-221	16	26	9.7	22	0.6	21	35.2	0.02	0.02	<0.01	0.15	12.50	0.5
638151	M-06-221	26	36	8.8	23	0.9	22	24.53	0.03	0.02	0.03	0.12	10.00	0.4
638152	M-06-221	36	46	9.9	27	1.6	25	17.28	0.05	0.04	<0.01	0.09	7.50	0.4
638153	M-06-221	46	56	8.8	27	0.6	26	43.2	0.02	0.02	<0.01	0.08	6.67	0.3
638154	M-06-221	56	66	NA	22	0.6	21	35.2	0.02	NA	NA	NA	NA	NA
638155	M-06-221	66	76	9	24	0.9	23	25.6	0.03	0.02	<0.01	0.07	5.83	0.3
638156	M-06-221	76	86	9	25	0.9	24	26.67	0.03	0.02	<0.01	0.08	6.67	0.3
638157	M-06-221	86	96	9	38	3.4	35	11.05	0.11	0.07	<0.01	0.27	22.50	1
638158	M-06-221	96	106	NA	39	1.6	37	24.96	0.05	NA	NA	NA	NA	NA
638159	M-06-221	106	116	9	43	3.4	40	12.51	0.11	0.08	<0.01	0.13	10.83	0.5
638160	M-06-221	116	126	8.9	55	2.8	52	19.56	0.09	0.07	<0.01	0.41	34.17	1.5
638161	M-06-221	126	136	8.8	60	1.6	58	38.4	0.05	0.03	<0.01	0.72	60.00	2.7
638162	M-06-221	154	168	NA	21	4.7	16	4.48	0.15	NA	NA	NA	NA	NA
638163	M-06-221	218	228	9.6	16	7.8	8	2.05	0.25	0.23	0.01	<0.05	4.17	0.2
638164	M-06-221	228	240	9.1	36	7.5	29	4.8	0.24	0.21	0.01	0.21	17.50	0.8
638165	M-07-261	24	34	9.7	24	2.5	22	9.6	0.08	0.06	0.02	0.06	5.00	0.2
638166	M-07-261	34	44	9.6	50	5.3	45	9.41	0.17	0.16	0.02	0.18	15.00	0.7
638167	M-07-261	44	54	9.6	37	16.3	21	2.28	0.52	0.49	0.03	0.17	14.17	0.6
638168	M-07-261	54	64	NA	15	5	10	3	0.16	NA	NA	NA	NA	NA
638169	M-07-261	64	74	9.6	27	8.4	19	3.2	0.27	0.24	0.02	0.15	12.50	0.6
638170	M-07-261	74	84	9.7	39	7.8	31	4.99	0.25	0.22	0.01	0.16	13.33	0.6
638171	M-07-309	0	10	9.3	24	1.3	23	19.2	0.04	0.04	0.02	<0.05	4.17	<0.2
638172	M-07-309	10	20	9.7	26	1.3	25	20.8	0.04	0.03	0.02	0.05	4.17	0.2
638173	M-07-309	20	30	9.5	27	0.9	26	28.8	0.03	0.02	<0.01	0.06	5.00	0.2
638174	M-07-309	30	40	9.4	23	1.3	22	18.4	0.04	0.04	0.01	<0.05	4.17	0.2
638175	M-07-309	40	50	NA	27	0.6	26	43.2	0.02	NA	NA	NA	NA	NA
638176	M-07-309	50	60	9	21	0.6	20	33.6	0.02	0.02	0.02	0.07	5.83	0.2
638177	M-07-309	60	70	9.2	75	0.6	74	120	0.02	0.02	<0.01	0.76	63.34	2.8
638178	M-07-309	70	80	8.6	44	0.3	44	140.8	0.01	0.02	<0.01	0.28	23.33	1
638179	M-05-80	8	18	8.5	67	0.6	66	107.2	0.02	0.02	<0.01	0.48	40.00	1.8
638180	M-05-80	24	34	9.2	41	0.3	41	131.2	0.01	0.01	<0.01	0.24	20.00	0.9
638181	M-05-80	34	44	9.2	41	0.3	41	131.2	0.01	0.01	<0.01	0.35	29.17	1.3
638182	M-05-80	68	78	9.5	31	2.5	29	12.4	0.08	0.07	0.01	0.13	10.83	0.5

NOTES:

NA = Not Analyzed

Summary of ABA Results from 2010 Mine Rock Samples

SAMPLE ID	Core	From	To	pH	NP	AP	NNP	NP/AP	Total S	Sulphide S	Sulphate S	C	Carb-NP	CO2
-	-	m	m	Unity	kg CaCO3/t	kg CaCO3/t	kg CaCO3/t	Unity	%	%	%	%	kg CaCO3/t	%
638183	M-05-80	78	89	9.6	20	9.7	10	2.06	0.31	0.32	<0.01	0.08	6.67	0.3
638184	M-05-76	10	20	9.8	26	1.9	24	13.87	0.06	0.05	0.01	0.2	16.67	0.7
638185	M-05-76	20	30	9.7	37	0.6	36	59.2	0.02	0.01	0.02	0.2	16.67	0.7
638186	M-05-76	30	40	9.8	45	0.6	44	72	0.02	0.01	0.01	0.27	22.50	1
638187	M-05-48	8	18	9.5	48	0.6	47	76.8	0.02	0.01	0.02	0.11	9.17	0.4
638188	M-05-48	34	44	9.7	49	0.6	48	78.4	0.02	0.02	0.02	0.08	6.67	0.3
638189	M-05-48	44	54	9.4	46	0.6	45	73.6	0.02	0.01	0.03	0.16	13.33	0.6
638190	M-05-48	54	64	NA	42	0.9	41	44.8	0.03	NA	NA	NA	NA	NA
638191	M-05-48	64	74	9.6	50	0.9	49	53.33	0.03	0.03	0.02	0.13	10.83	0.5
638192	M-05-72	6	16	9.2	34	3.1	31	10.88	0.1	0.09	0.02	0.11	9.17	0.4
638193	M-05-72	38	48	9.6	36	2.2	34	16.46	0.07	0.06	0.01	0.16	13.33	0.6
638194	M-05-72	48	58	9.2	46	2.8	43	16.36	0.09	0.08	0.03	0.15	12.50	0.5
638195	M-05-72	58	68	9.7	38	3.4	35	11.05	0.11	0.1	<0.01	0.12	10.00	0.5
638196	M-05-73	3	13	NA	35	0.9	34	37.33	0.03	NA	NA	NA	NA	NA
638197	M-05-73	13	23	9.1	27	14.1	13	1.92	0.45	0.38	0.02	0.17	14.17	0.6
638198	M-05-73	23	33	9.2	44	5.6	38	7.82	0.18	0.14	0.01	0.11	9.17	0.4
638199	M-05-73	33	43	9.9	33	2.2	31	15.09	0.07	0.06	0.01	0.07	5.83	0.3
638200	M-05-105	0	8	NA	22	1.3	21	17.6	0.04	NA	NA	NA	NA	NA
638201	M-05-105	8	18	9.1	40	1.9	38	21.33	0.06	0.04	0.02	0.22	18.33	0.8
638202	M-05-105	78	88	NA	26	0.9	25	27.73	0.03	NA	NA	NA	NA	NA
638203	M-05-105	88	98	9.8	22	0.6	21	35.2	0.02	0.02	<0.01	0.06	5.00	0.2
638204	M-05-106	2	12	9.4	47	2.2	45	21.49	0.07	0.06	0.02	0.15	12.50	0.5
638205	M-05-106	12	22	NA	59	0.6	58	94.4	0.02	NA	NA	NA	NA	NA
638206	M-05-106	22	32	9.3	33	2.2	31	15.09	0.07	0.06	<0.01	0.18	15.00	0.7
638207	M-05-106	32	42	NA	45	2.2	43	20.57	0.07	NA	NA	NA	NA	NA
638208	M-05-106	42	52	NA	33	1.9	31	17.6	0.06	NA	NA	NA	NA	NA
638209	M-05-106	128	138	9.2	35	26.9	8	1.3	0.86	0.7	<0.01	0.11	9.17	0.4
638210	M-05-106	138	145	9.2	16	27.8	-12	0.58	0.89	0.8	<0.01	0.05	4.17	0.2
638211	M-05-114	10	20	8.9	21	0.9	20	22.4	0.03	0.02	<0.01	0.11	9.17	0.4
638212	M-05-114	20	30	8.8	20	1.9	18	10.67	0.06	0.04	0.01	0.12	10.00	0.5
638213	M-05-114	30	40	8.5	17	2.8	14	6.04	0.09	0.07	<0.01	0.05	4.17	0.2
638214	M-05-114	40	50	8.7	26	1.9	24	13.87	0.06	0.03	0.01	0.18	15.00	0.7
638215	M-05-114	50	60	8.9	37	1.6	35	23.68	0.05	0.02	<0.01	0.26	21.67	1

NOTES:

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Summary of ABA Results from 2010 Mine Rock Samples

SAMPLE ID	Core	From	To	pH	NP	AP	NNP	NP/AP	Total S	Sulphide S	Sulphate S	C	Carb-NP	CO2
-	-	m	m	Unity	kg CaCO3/t	kg CaCO3/t	kg CaCO3/t	Unity	%	%	%	%	kg CaCO3/t	%
638216	M-05-114	60	70	NA	17	0.3	17	54.4	0.01	NA	NA	NA	NA	NA
638217	M-06-156	2	12	9.4	47	1.6	45	30.08	0.05	<0.01	0.06	0.33	27.50	1.2
638218	M-06-156	12	22	9.4	41	1.6	39	26.24	0.05	0.04	<0.01	0.19	15.83	0.7
638219	M-06-156	22	32	9.5	62	1.3	61	49.6	0.04	0.02	<0.01	0.64	53.34	2.3
638220	M-06-156	32	42	9.1	44	11.6	32	3.81	0.37	0.33	<0.01	0.36	30.00	1.3
638221	M-06-136	5	15	NA	41	3.1	38	13.12	0.1	NA	NA	NA	NA	NA
638222	M-06-136	15	25	9.6	57	8.1	49	7.02	0.26	0.19	<0.01	0.08	6.67	0.3
638223	M-06-136	25	35	NA	30	1.9	28	16	0.06	NA	NA	NA	NA	NA
638224	M-06-136	35	45	9.5	84	9.1	75	9.27	0.29	0.21	<0.01	0.08	6.67	0.3
638225	M-05-130	0	10	NA	40	9.1	31	4.41	0.29	NA	NA	NA	NA	NA
638226	M-05-130	10	20	8.8	30	5.6	24	5.33	0.18	0.18	<0.01	0.11	9.17	0.4
638227	M-05-130	20	30	8.8	24	6.9	17	3.49	0.22	0.18	<0.01	0.1	8.33	0.4
638228	M-05-130	30	40	NA	32	10.3	22	3.1	0.33	NA	NA	NA	NA	NA
638229	M-05-130	40	50	9.2	25	2.5	23	10	0.08	0.06	<0.01	0.06	5.00	0.2
638230	M-05-130	50	60	9.1	29	1.6	27	18.56	0.05	0.05	0.01	0.09	7.50	0.3
638231	M-05-130	60	70	NA	23	0.9	22	24.53	0.03	NA	NA	NA	NA	NA
638232	M-05-130	70	80	9.5	32	0.3	32	102.4	0.01	0.01	<0.01	0.07	5.83	0.3
638233	M-05-130	80	90	9.2	59	0.9	58	62.93	0.03	0.03	<0.01	0.13	10.83	0.5
638234	M-05-130	98	110	9.5	41	0.6	40	65.6	0.02	0.02	<0.01	0.22	18.33	0.8
638235	M-06-144	4	14	8.5	17	2.5	15	6.8	0.08	0.06	<0.01	0.07	5.83	0.2
638236	M-06-144	14	24	8.7	22	3.1	19	7.04	0.1	0.08	0.02	0.21	17.50	0.8
638237	M-06-144	24	34	8.8	38	2.8	35	13.51	0.09	0.07	<0.01	0.59	49.17	2.2
638238	M-06-144	34	44	9.3	17	3.8	13	4.53	0.12	0.09	0.01	0.13	10.83	0.5
638239	M-06-144	44	54	NA	30	4.1	26	7.38	0.13	NA	NA	NA	NA	NA
638240	M-06-144	54	64	9.4	29	4.7	24	6.19	0.15	0.12	<0.01	0.19	15.83	0.7
638241	M-06-144	64	74	9	44	7.5	37	5.87	0.24	0.19	<0.01	0.32	26.67	1.2
638242	M-06-144	74	84	9.1	27	12.5	15	2.16	0.4	0.34	<0.01	0.12	10.00	0.4
638243	M-06-144	84	94	9.2	47	7.8	39	6.02	0.25	0.2	<0.01	0.23	19.17	0.9
638244	MB-08-09	0	10	NA	25	0.6	24	40	0.02	NA	NA	NA	NA	NA
638245	MB-08-09	10	20	9.4	24	0.3	24	76.8	0.01	0.01	<0.01	0.08	6.67	0.3
638246	MB-08-09	20	30	9.5	25	0.3	25	80	0.01	0.01	0.01	0.08	6.67	0.3
638247	MB-08-09	30	40	9.6	42	0.6	41	67.2	0.02	0.01	0.02	0.12	10.00	0.5
638248	MB-08-09	40	50	NA	36	0.3	36	115.2	0.01	NA	NA	NA	NA	NA

NOTES:

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SAMPLE ID	Core	From	To	pH	NP	AP	NNP	NP/AP	Total S	Sulphide S	Sulphate S	C	Carb-NP	CO2
-	-	m	m	Unity	kg CaCO3/t	kg CaCO3/t	kg CaCO3/t	Unity	%	%	%	%	kg CaCO3/t	%
638249	MB-08-09	50	60	9.7	44	0.3	44	140.8	0.01	0.01	<0.01	0.09	7.50	0.3
638250	MB-08-09	60	70	9.4	34	<0.3	34	217.6	<0.01	0.01	<0.01	0.1	8.33	0.4
638251	MB-08-09	70	80	9.4	39	0.3	39	124.8	0.01	<0.01	0.01	0.11	9.17	0.4
638252	MB-08-09	80	90	9.4	33	3.1	30	10.56	0.1	0.09	0.02	0.07	5.83	0.3
638253	MB-08-09	90	97	NA	21	0.9	20	22.4	0.03	NA	NA	NA	NA	NA
638254	MB-08-09	105	115	NA	18	2.2	16	8.23	0.07	NA	NA	NA	NA	NA
638255	MB-08-09	115	123	9.4	31	0.9	30	33.07	0.03	0.02	<0.01	0.07	5.83	0.3
638256	MB-08-09	159	169	9.3	18	6.3	12	2.88	0.2	0.18	0.04	<0.05	4.17	0.2
638257	MB-08-13	0	10	NA	35	0.6	34	56	0.02	NA	NA	NA	NA	NA
638258	MB-08-13	10	20	NA	49	0.3	49	156.8	0.01	NA	NA	NA	NA	NA
638259	MB-08-13	20	30	9.6	34	0.3	34	108.8	0.01	<0.01	<0.01	0.1	8.33	0.4
638260	MB-08-13	30	38	NA	40	0.9	39	42.67	0.03	NA	NA	NA	NA	NA
638261	MB-08-13	60	70	9.6	46	3.4	43	13.38	0.11	0.09	0.02	0.07	5.83	0.3
638262	MB-08-13	70	80	NA	63	4.1	59	15.51	0.13	NA	NA	NA	NA	NA
638263	MB-08-13	80	90	9.7	18	0.9	17	19.2	0.03	0.02	0.02	0.05	4.17	0.2
638264	MB-08-13	90	98	NA	28	1.3	27	22.4	0.04	NA	NA	NA	NA	NA
638265	MB-08-13	168	178	9.7	21	3.1	18	6.72	0.1	0.07	0.04	0.05	4.17	0.2
638266	MB-08-33	20	30	NA	46	0.9	45	49.07	0.03	NA	NA	NA	NA	NA
638267	MB-08-33	30	38	8.9	46	13.1	33	3.5	0.42	0.34	0.04	0.13	10.83	0.5
638268	MB-08-36	41	51	NA	17	3.4	14	4.95	0.11	NA	NA	NA	NA	NA
638269	MB-08-36	51	63	9.1	17	2.5	15	6.8	0.08	0.05	0.02	<0.05	4.17	<0.2
638270	M-08-433	8	18	9.5	22	0.6	21	35.2	0.02	0.01	0.02	0.1	8.33	0.4
638271	M-08-433	18	28	9.5	21	0.3	21	67.2	0.01	0.01	0.02	<0.05	4.17	0.2
638272	M-08-433	28	38	9.7	46	0.6	45	73.6	0.02	0.02	0.03	0.13	10.83	0.5
638273	M-08-433	38	48	NA	23	1.3	22	18.4	0.04	NA	NA	NA	NA	NA
638274	M-08-433	48	58	9.4	39	0.9	38	41.6	0.03	0.02	0.02	0.11	9.17	0.4
638275	M-08-433	58	68	9.6	30	0.3	30	96	0.01	<0.01	0.01	0.05	4.17	0.2
638276	M-08-433	68	78	9.6	41	2.5	39	16.4	0.08	0.05	0.04	0.12	10.00	0.5
638277	M-08-433	78	88	NA	16	0.3	16	51.2	0.01	NA	NA	NA	NA	NA
638278	M-08-433	88	98	9.4	50	0.3	50	160	0.01	0.01	<0.01	0.2	16.67	0.7
638279	M-08-433	98	108	9.6	24	0.9	23	25.6	0.03	0.02	<0.01	<0.05	4.17	<0.2
638280	M-08-433	108	118	9.5	38	1.6	36	24.32	0.05	0.04	0.03	0.17	14.17	0.6
638281	M-08-433	118	128	NA	46	0.9	45	49.07	0.03	NA	NA	NA	NA	NA

NOTES:

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Summary of ABA Results from 2010 Mine Rock Samples

SAMPLE ID	Core	From	To	pH	NP	AP	NNP	NP/AP	Total S	Sulphide S	Sulphate S	C	Carb-NP	CO2
-	-	m	m	Unity	kg CaCO3/t	kg CaCO3/t	kg CaCO3/t	Unity	%	%	%	%	kg CaCO3/t	%
638282	M-08-433	128	138	8.7	45	0.6	44	72	0.02	0.01	0.03	0.09	7.50	0.3
638283	M-08-433	138	148	8.2	51	0.3	51	163.2	0.01	0.01	0.01	0.09	7.50	0.3
638284	M-08-433	148	158	NA	38	1.9	36	20.27	0.06	NA	NA	NA	NA	NA
638285	M-08-433	158	168	9.8	24	0.3	24	76.8	0.01	0.01	0.02	<0.05	4.17	0.2
638286	M-08-433	168	178	9.7	27	0.3	27	86.4	0.01	<0.01	<0.01	0.06	5.00	0.2
638287	M-08-433	178	188	9.7	24	0.6	23	38.4	0.02	0.01	<0.01	0.07	5.83	0.3
638288	M-08-433	188	198	9.2	30	1.6	28	19.2	0.05	0.04	0.01	0.13	10.83	0.5
638289	M-08-433	198	208	NA	34	1.9	32	18.13	0.06	NA	NA	NA	NA	NA
638290	M-08-463	3	13	8.9	49	3.1	46	15.68	0.1	0.09	0.02	0.13	10.83	0.5
638291	M-08-463	13	23	9.6	47	4.1	43	11.57	0.13	0.11	0.01	0.11	9.17	0.4
638292	M-08-463	23	33	NA	21	0.3	21	67.2	0.01	NA	NA	NA	NA	NA
638293	M-08-463	33	43	9.3	17	0.3	17	54.4	0.01	0.01	0.01	<0.05	4.17	<0.2
638294	M-08-463	43	53	9.6	39	1.3	38	31.2	0.04	0.05	0.02	0.08	6.67	0.3
638295	M-08-463	53	63	9.7	12	0.6	11	19.2	0.02	0.02	0.03	<0.05	4.17	0.2
638296	M-08-463	63	73	9	8	0.3	8	25.6	0.01	<0.01	0.02	0.05	4.17	0.2
638297	M-08-463	73	83	9	25	1.9	23	13.33	0.06	0.06	0.03	<0.05	4.17	0.2
638298	M-08-463	83	93	NA	12	0.3	12	38.4	0.01	NA	NA	NA	NA	NA
638299	M-08-463	93	103	9.2	21	0.3	21	67.2	0.01	<0.01	0.02	<0.05	4.17	<0.2
638300	M-08-463	103	113	9.4	15	0.3	15	48	0.01	0.01	0.01	<0.05	4.17	<0.2
638301	M-08-463	113	123	9.7	38	<0.3	38	243.2	<0.01	<0.01	0.02	0.06	5.00	0.2
638302	M-08-463	123	133	9.5	14	0.3	14	44.8	0.01	0.01	0.02	0.05	4.17	0.2
638303	M-08-463	133	143	NA	25	0.6	24	40	0.02	NA	NA	NA	NA	NA
638304	M-08-463	143	153	9.5	30	0.3	30	96	0.01	<0.01	0.03	0.05	4.17	0.2
638305	M-08-463	153	163	9.4	22	0.3	22	70.4	0.01	<0.01	0.02	0.08	6.67	0.3
638306	M-08-463	163	173	9.6	23	0.3	23	73.6	0.01	0.01	0.01	0.13	10.83	0.5
638307	M-08-463	173	183	9.3	22	0.3	22	70.4	0.01	<0.01	<0.01	0.09	7.50	0.3

NOTES:

NA = Not Analyzed

Summary of Bulk Metal Content of 2010 Mine Rock Samples

SAMPLE ID	Core	From	To	Ag	Al	As	B	Ba	Be	Bi	Ca	Cd	Co	Cr	Cu	Fe	Ga	Hg	K	La	Li	Mg	Mn	Mo	Na	Ni	P	Pb	S	Sb	Sc	Se	Sn	Sr	Th	Ti	Tl	U	V	W	Y	Zn
-	-	m	m	ppm	%	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	%	ppm	ppm	%	ppm	ppm	%	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
638051	M-07-412	3	13	0.2	1.62	5	<10	70	<0.5	<2	1.65	<0.5	40	4	106	6.64	<10	<1	0.12	20	NA	2.63	1075	1	0.28	75	2900	<2	0.03	<2	2	NA	NA	140	<20	0.08	<10	<10	81	<10	NA	72
638052	M-07-412	13	23	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
638053	M-07-412	23	33	0.2	1.3	5	<10	60	<0.5	<2	1.41	<0.5	22	67	377	4.23	<10	1	0.14	30	NA	1.26	522	1	0.24	51	2290	2	0.07	<2	2	NA	NA	114	<20	0.14	<10	<10	131	<10	NA	44
638054	M-07-412	33	43	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
638055	M-07-412	43	53	0.4	1.08	2	<10	40	<0.5	<2	1.57	<0.5	36	123	839	6	<10	<1	0.12	30	NA	1.97	663	1	0.17	122	3570	2	0.12	2	2	NA	NA	84	<20	0.16	<10	<10	174	<10	NA	50
638056	M-07-412	53	63	<0.2	0.66	2	<10	20	<0.5	<2	0.62	<0.5	44	274	261	5.59	<10	<1	0.02	<10	NA	2.83	661	<1	0.12	166	330	<2	0.08	<2	2	NA	NA	42	<20	0.14	<10	<10	152	<10	NA	50
638057	M-07-412	63	73	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
638058	M-07-412	143	159	0.2	1.84	6	<10	60	<0.5	<2	1.21	<0.5	26	41	256	4.94	<10	1	0.07	10	NA	1.27	525	1	0.33	51	640	2	0.07	<2	2	NA	NA	138	<20	0.18	<10	<10	219	<10	NA	41
638059	M-07-349	4	14	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
638060	M-07-349	14	24	<0.2	1.48	<2	<10	20	<0.5	<2	1.14	<0.5	11	58	12	2.22	<10	<1	0.08	10	NA	0.79	325	1	0.13	19	620	3	0.02	<2	6	NA	NA	42	<20	0.11	<10	<10	69	<10	NA	46
638061	M-07-349	24	34	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
638062	M-07-349	34	44	<0.2	1.37	2	<10	60	<0.5	<2	1.27	<0.5	13	70	24	3.36	<10	<1	0.25	10	NA	1.08	391	1	0.13	16	1300	3	0.04	<2	3	NA	NA	59	<20	0.12	<10	<10	105	<10	NA	53
638063	M-07-349	44	54	<0.2	1.17	2	<10	30	<0.5	<2	0.92	<0.5	11	56	52	2.56	10	1	0.09	10	NA	0.76	297	2	0.11	16	880	<2	0.14	<2	3	NA	NA	38	<20	0.13	<10	<10	77	<10	NA	50
638064	M-07-349	54	64	<0.2	1.39	5	<10	20	<0.5	<2	1.36	<0.5	13	102	27	2.26	10	<1	0.06	10	NA	1.33	352	3	0.09	36	680	5	0.07	<2	4	NA	NA	44	<20	0.12	<10	<10	53	<10	NA	70
638065	M-07-349	64	74	<0.2	1.22	2	<10	30	<0.5	<2	1.24	<0.5	11	76	23	2.56	<10	1	0.12	10	NA	0.92	332	1	0.09	20	940	3	0.05	<2	4	NA	NA	43	<20	0.13	<10	<10	78	<10	NA	59
638066	M-07-352	8	18	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
638067	M-07-352	18	28	<0.2	0.81	2	<10	50	<0.5	<2	0.81	<0.5	64	3	70	8.84	<10	<1	0.13	30	NA	4.62	1470	1	0.16	132	1580	<2	0.02	<2	2	NA	NA	61	<20	0.11	<10	<10	88	<10	NA	95
638068	M-07-352	28	38	0.3	1.22	<2	<10	70	<0.5	<2	1.07	<0.5	68	2	99	9.68	<10	<1	0.09	10	NA	4.83	1585	<1	0.23	150	2070	<2	0.02	<2	2	NA	NA	107	<20	0.16	<10	<10	119	<10	NA	99
638069	M-07-352	38	48	0.2	1.59	5	<10	110	<0.5	<2	1.18	<0.5	52	5	104	7.37	<10	<1	0.13	10	NA	3.76	1245	1	0.29	106	1610	<2	0.02	<2	2	NA	NA	134	<20	0.15	<10	<10	75	<10	NA	78
638070	M-07-352	48	58	<0.2	1.64	<2	<10	100	<0.5	<2	1.28	<0.5	57	6	94	7.53	<10	1	0.15	20	NA	4.01	1220	<1	0.28	114	2060	<2	0.03	<2	2	NA	NA	144	<20	0.14	<10	<10	103	<10	NA	73
638071	M-07-352	58	68	0.3	1.85	2	<10	90	<0.5	<2	1.08	<0.5	58	4	58	7.63	<10	1	0.14	10	NA	4.35	1280	<1	0.35	122	580	2	0.03	4	2	NA	NA	151	<20	0.1	<10	<10	58	<10	NA	72
638072	M-07-352	68	78	0.9	2.19	<2	<10	90	<0.5	<2	1.55	<0.5	46	22	1060	6.35	10	<1	0.15	20	NA	3.44	965	<1	0.33	125	960	4	0.08	<2	2	NA	NA	160	<20	0.1	<10	<10	101	<10	NA	62
638073	M-07-417	10	20	<0.2	1.32	<2	<10	30	<0.5	<2	0.78	<0.5	22	103	26	5.01	10	<1	0.05	<10	NA	0.87	347	1	0.25	40	60	2	0.01	<2	3	NA	NA	48	<20	0.24	<10	<10	255	<10	NA	36
638074	M-07-417	20	30	<0.2	1.13	<2	<10	40	<0.5	<2	0.81	<0.5	35	109	114	5.73	<10	<1	0.1	10	NA	1.7	591	1	0.17	60	770	2	0.03	<2	2	NA	NA	63	<20	0.17	<10	<10	241	<10	NA	42
638075	M-07-417	30	40	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
638076	M-07-417	40	50	<0.2	1.3	3	<10	50	<0.5	<2	0.82	<0.5	19	116	32	4.56	10	1	0.09	<10	NA	0.56	250	1	0.24	30	190	2	0.01	<2	2	NA	NA	45	<20	0.21	<10	<10	223	<10	NA	32
638077	M-07-417	50	60	<0.2	1.36	<2	<10	40	<0.5	<2	0.86	<0.5	15	117	75	3.68	10	<1	0.07	<10	NA	0.4	189	1	0.28	26	290	<2	0.01	<2	2	NA	NA	58	<20	0.18	<10	10	216	<10	NA	32
638078	M-07-417	60	70	<0.2	0.7	8	<10	70	0.6	<2	1.1	<0.5	11	47	37	4.17	<10	<1	0.16	130	NA	0.45	847	4	0.16	14	240	10	0.06	2	2	NA	NA	58	20	0.15	<10	<10	97	<10	NA	108
638079	M-07-417	70	80	<0.2	0.74	5	<10	50	2.3	<2	1.42	<0.5	26	165	119	8.68	<10	<1	0.12	240	NA	1.29	971	8	0.11	53	790	9	0.04	3	2	NA	NA	93	40	0.27	<10	<10	200	<10	NA	175
638080	M-07-417	80	90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
638081	M-07-417	90	100	0.4	0.73	5	<10	60	<0.5	<2	0.62	<0.5	148	24	38	20.1	10	1	0.18	20	NA	10.65	2950	<1	0.08	305	1770	<2	0.01	3	5	NA	NA	37	<20	0.46	<10	<10	433	<10	NA	185
638082	M-07-417	100	110	0.2	0.78	7	<10	40	<0.5	<2	0.54	<0.5	105	5	29	13	<10	<1	0.06	10	NA	8.21	2050	<1	0.12	238	550	<2	0.01	<2	3	NA	NA	59	<20	0.1	<10	<10	71	<10	NA	120
638083	M-07-417	110	120	0.4	1.7	6	<10	60	<0.5	<2	1.02	<0.5	91	10	53	10.65	<10	1	0.11	70	NA	7.36	1730	2	0.21	255	580	2	0.03	2	3	NA	NA	108	<20	0.06	<10	<10	41	<10	NA	117
638084	M-07-417	120	130	<0.2	1.57	6	<10	70	2.2	<2	1.56	<0.5	16	18	38	5.17	<10	1	0.09	290	NA	1.04	1080	5	0.31	37	260	66	0.02	<2	1	NA	NA	132	100	0.07	<10	<10	31	<10	NA	123
638085	M-07-417	130	140	<0.2	1.25	8	<10	90	13.2	<2	2.48	<0.5	25	136	73	7.11	10	<1	0.15	690	NA	1.75	983	7	0.21	58	350	60	0.03	<2	4	NA	NA	97	260	0.18	<10	<10	105	10	NA	233
638086	M-07-417	140	150	<0.2	1.54	<2	<10	60	1.2	<2	1.51	<0.5	24	274	209	6.29	10	<1	0.12	90																						

Summary of Bulk Metal Content of 2010 Mine Rock Samples

SAMPLE ID	Core	From	To	Ag	Al	As	B	Ba	Be	Bi	Ca	Cd	Co	Cr	Cu	Fe	Ga	Hg	K	La	Li	Mg	Mn	Mo	Na	Ni	P	Pb	S	Sb	Sc	Se	Sn	Sr	Th	Ti	Tl	U	V	W	Y	Zn		
-	-	m	m	ppm	%	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	%	ppm	ppm	%	ppm	ppm	%	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	
638121	M-06-202	19	29	0.2	0.82	<2	<10	50	<0.5	<2	0.77	<0.5	67	241	158	9.78	<10	<1	0.1	10	NA	3.56	1180	<1	0.11	129	1260	<2	0.03	<2	3	NA	NA	41	<20	0.31	<10	<10	<10	345	<10	NA	75	
638122	M-06-202	29	39	<0.2	1.4	2	<10	40	<0.5	<2	0.99	<0.5	19	108	136	4.04	<10	<1	0.1	10	NA	0.69	296	<1	0.28	33	340	<2	<0.01	<2	2	NA	NA	59	<20	0.19	<10	<10	<10	195	<10	NA	30	
638123	M-06-202	39	49	<0.2	1.38	3	<10	40	<0.5	<2	0.94	<0.5	17	112	78	4.32	10	<1	0.06	<10	NA	0.37	230	<1	0.29	29	250	<2	<0.01	<2	3	NA	NA	57	<20	0.18	<10	<10	<10	241	<10	NA	35	
638124	M-06-202	49	59	<0.2	0.79	<2	<10	30	<0.5	<2	0.66	<0.5	44	224	107	6.99	<10	<1	0.05	<10	NA	2.06	727	<1	0.14	80	350	<2	0.01	<2	3	NA	NA	35	<20	0.28	<10	<10	<10	271	<10	NA	64	
638125	M-06-202	59	69	0.3	1.28	<2	<10	60	<0.5	<2	0.8	<0.5	49	105	181	6.41	<10	1	0.14	<10	NA	3.41	753	<1	0.19	173	530	<2	0.02	<2	2	NA	NA	53	<20	0.13	<10	<10	<10	141	<10	NA	57	
638126	M-06-202	69	79	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		
638127	M-06-202	79	89	0.4	0.56	<2	<10	30	<0.5	<2	0.35	<0.5	142	20	48	18.3	<10	1	0.04	<10	NA	9.52	2830	<1	0.08	282	500	5	<0.01	<2	5	NA	NA	37	<20	0.39	<10	<10	<10	364	<10	NA	170	
638128	M-06-202	89	99	0.3	1.18	<2	<10	70	<0.5	<2	0.71	<0.5	100	5	35	11.65	<10	<1	0.19	10	NA	6.83	1860	<1	0.21	215	800	<2	0.01	<2	3	NA	NA	82	<20	0.12	<10	<10	<10	72	<10	NA	113	
638129	M-06-202	99	109	<0.2	1.33	<2	<10	100	<0.5	<2	1.1	<0.5	95	9	90	11.5	<10	<1	0.16	20	NA	7.01	1790	<1	0.24	243	2450	3	0.01	<2	3	NA	NA	100	<20	0.19	<10	<10	<10	133	<10	NA	112	
638130	M-06-202	109	119	<0.2	0.39	3	<10	40	1.6	<2	1.27	<0.5	5	4	52	4.15	<10	<1	0.21	250	NA	0.22	1120	3	0.18	8	270	21	0.28	<2	1	NA	NA	48	40	0.08	<10	<10	<10	23	<10	NA	121	
638131	M-06-202	119	129	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		
638132	M-06-202	129	139	<0.2	2.06	2	<10	70	<0.5	<2	2.12	<0.5	29	92	134	5.57	10	<1	0.14	30	NA	1.36	538	<1	0.3	74	2420	<2	0.02	<2	2	NA	NA	127	<20	0.24	<10	<10	<10	301	<10	NA	50	
638133	M-06-202	139	149	<0.2	1.42	<2	<10	50	<0.5	<2	0.82	<0.5	51	414	184	6.58	10	<1	0.1	10	NA	2.78	750	<1	0.26	173	230	<2	0.02	<2	2	NA	NA	94	<20	0.31	<10	<10	<10	207	<10	NA	60	
638134	M-06-202	149	159	<0.2	1.6	<2	<10	60	<0.5	<2	1.07	<0.5	57	288	154	6.73	<10	<1	0.11	10	NA	3.84	900	<1	0.27	220	590	<2	0.03	<2	2	NA	NA	114	<20	0.18	<10	<10	<10	105	<10	NA	63	
638135	M-06-202	159	169	0.5	1.89	<2	<10	70	<0.5	<2	1.32	<0.5	58	38	1330	7.58	10	<1	0.1	10	NA	2.99	896	<1	0.33	162	850	<2	0.21	2	2	NA	NA	151	<20	0.27	<10	<10	<10	242	<10	NA	63	
638136	M-06-202	169	179	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
638137	M-06-202	179	189	0.6	1.34	<2	<10	70	<0.5	3	1.66	<0.5	73	418	829	9.1	<10	<1	0.1	20	NA	5.46	1200	<1	0.22	369	4180	<2	0.2	<2	3	NA	NA	122	<20	0.22	<10	<10	<10	202	<10	NA	84	
638138	M-06-208	2	12	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
638139	M-06-208	12	22	0.2	1.09	<2	<10	30	<0.5	<2	0.83	<0.5	30	58	110	4.16	<10	<1	0.05	<10	NA	1.67	540	<1	0.21	60	320	<2	0.01	<2	2	NA	NA	60	<20	0.1	<10	<10	<10	83	<10	NA	37	
638140	M-06-208	22	32	<0.2	1.79	<2	<10	30	<0.5	<2	1.02	<0.5	22	82	86	3.17	<10	<1	0.07	<10	NA	0.99	354	<1	0.36	41	160	<2	0.01	<2	2	NA	NA	228	<20	0.15	<10	<10	<10	133	<10	NA	30	
638141	M-06-208	32	42	<0.2	0.76	2	<10	50	<0.5	<2	0.72	<0.5	97	24	70	11.8	<10	<1	0.11	10	NA	6.69	1895	<1	0.14	224	1450	<2	0.01	<2	3	NA	NA	55	<20	0.11	<10	<10	<10	86	<10	NA	119	
638142	M-06-208	42	52	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
638143	M-06-208	52	62	0.2	1.33	<2	<10	60	<0.5	<2	1.09	<0.5	54	12	35	7.58	<10	<1	0.09	10	NA	3.44	1175	<1	0.21	111	1840	<2	<0.01	<2	2	NA	NA	95	<20	0.09	<10	<10	<10	102	<10	NA	70	
638144	M-06-208	62	72	0.2	0.86	<2	<10	40	<0.5	<2	0.95	<0.5	48	71	69	8.89	10	<1	0.05	10	NA	1.78	891	<1	0.12	68	2530	<2	<0.01	<2	3	NA	NA	73	<20	0.57	<10	<10	<10	685	<10	NA	76	
638145	M-06-208	72	82	0.4	1.73	2	<10	30	<0.5	<2	1.11	<0.5	36	236	645	4.38	<10	<1	0.05	<10	NA	2.49	537	<1	0.28	191	210	<2	0.11	<2	2	NA	NA	95	<20	0.1	<10	<10	<10	97	<10	NA	38	
638146	M-06-208	82	92	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
638147	M-06-208	148	158	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
638148	M-06-208	158	168	0.2	0.85	<2	<10	50	<0.5	<2	0.92	<0.5	11	132	96	3.32	<10	<1	0.06	20	NA	0.5	235	<1	0.15	35	1690	<2	0.27	<2	2	NA	NA	56	<20	0.09	<10	<10	<10	99	<10	NA	38	
638149	M-06-221	6	16	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
638150	M-06-221	16	26	0.3	0.72	2	<10	30	<0.5	2	0.48	<0.5	32	329	150	5.49	<10	<1	0.06	<10	NA	1.61	393	<1	0.1	110	210	<2	<0.01	2	2	NA	NA	31	<20	0.28	<10	<10	<10	229	<10	NA	43	
638151	M-06-221	26	36	0.2	0.7	<2	<10	30	<0.5	<2	0.57	<0.5	49	213	85	6.58	<10	<1	0.06	<10	NA	2.87	827	<1	0.12	158	500	<2	<0.01	<2	2	NA	NA	44	<20	0.22	<10	<10	<10	158	<10	NA	65	
638152	M-06-221	36	46	0.4	0.79	<2	<10	80	<0.5	<2	0.37	<0.5	135	37	66	20	10	<1	0.24	10	NA	7.86	2550	<1	0.11	276	900	<2	0.03	2	5	NA	NA	33	<20	0.84	<10	<10	<10	841	<10	NA	173	
638153	M-06-221	46	56	<0.2	0.56	<2	<10	50	<0.5	<2	0.42	<0.5	121	3	27	14.2	<10	<1	0.1	10	NA	9.07	2320	<1	0.08	272	730	<2	0.01	<2	4	NA	NA	38	<20	0.07	<10	<10	<10	48	<10	NA	133	
638154	M-06-221	56	66	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
638155	M-06-221	66	76	0.3	1.02	7	<10	60	<0.5	<2	0.75	<0.5																																

Summary of Bulk Metal Content of 2010 Mine Rock Samples

SAMPLE ID -	Core -	From m	To m	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	Li ppm	Mg %	Mn ppm	Mo ppm	Na %	Ni ppm	P ppm	Pb ppm	S %	Sb ppm	Sc ppm	Se ppm	Sn ppm	Sr ppm	Th ppm	Ti %	Tl ppm	U ppm	V ppm	W ppm	Y ppm	Zn ppm
638191	M-05-48	64	74	<0.2	2.7	7	<10	80	<0.5	<2	1.87	<0.5	26	17	152	4.43	10	<1	0.1	<10	NA	1.5	515	<1	0.46	67	410	2	0.03	<2	2	NA	NA	214	<20	0.12	<10	<10	149	<10	NA	32
638192	M-05-72	6	16	0.4	1.75	2	<10	60	<0.5	<2	1.41	<0.5	24	46	508	5.02	10	<1	0.09	10	NA	0.82	384	1	0.31	59	1280	2	0.1	3	1	NA	NA	133	<20	0.16	<10	<10	265	<10	NA	35
638193	M-05-72	38	48	0.4	2.01	2	<10	100	<0.5	<2	1.59	<0.5	31	7	439	6.76	10	<1	0.17	10	NA	0.94	424	<1	0.35	47	1310	<2	0.06	<2	3	NA	NA	149	<20	0.22	<10	<10	558	<10	NA	43
638194	M-05-72	48	58	0.3	1.54	2	<10	130	<0.5	<2	3.45	<0.5	52	<1	666	9.52	10	<1	0.15	50	NA	2.21	838	<1	0.21	38	>10000	2	0.08	<2	3	NA	NA	446	<20	0.16	<10	<10	615	<10	NA	72
638195	M-05-72	58	68	0.4	1.04	<2	<10	40	<0.5	<2	3.63	<0.5	47	4	526	9.7	10	<1	0.07	50	NA	1.56	778	1	0.13	28	>10000	3	0.11	<2	5	NA	NA	115	<20	0.13	<10	<10	574	<10	NA	73
638196	M-05-73	3	13	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
638197	M-05-73	13	23	<0.2	2.02	2	<10	30	<0.5	<2	1.42	<0.5	9	36	122	6.05	10	<1	0.07	10	NA	0.54	978	2	0.3	20	730	3	0.44	<2	3	NA	NA	53	<20	0.12	<10	<10	51	<10	NA	40
638198	M-05-73	23	33	<0.2	1.12	8	20	30	0.7	<2	1.38	<0.5	27	211	62	5.02	<10	<1	0.1	30	NA	2.3	996	1	0.13	133	1880	3	0.18	<2	3	NA	NA	109	<20	0.32	<10	<10	106	<10	NA	59
638199	M-05-73	33	43	0.3	1.11	3	<10	50	<0.5	<2	1.21	<0.5	15	66	170	3.75	10	<1	0.17	20	NA	0.84	283	<1	0.2	23	2740	3	0.07	<2	2	NA	NA	71	<20	0.13	<10	<10	193	<10	NA	41
638200	M-05-105	0	8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
638201	M-05-105	8	18	0.3	2.42	<2	<10	70	0.7	<2	1.88	<0.5	24	19	302	4.77	10	<1	0.13	70	NA	1.19	496	1	0.38	50	440	6	0.05	<2	2	NA	NA	172	<20	0.16	<10	<10	260	<10	NA	31
638202	M-05-105	78	88	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
638203	M-05-105	88	98	0.2	1.47	<2	<10	420	<0.5	<2	0.93	<0.5	26	278	11	5.36	10	<1	0.65	20	NA	2.34	436	<1	0.09	36	1780	3	0.02	<2	3	NA	NA	72	<20	0.29	<10	<10	171	<10	NA	69
638204	M-05-106	2	12	0.2	1.27	3	<10	50	<0.5	<2	1.18	<0.5	28	193	283	5.05	10	<1	0.13	20	NA	1.46	485	<1	0.21	86	1140	2	0.07	<2	2	NA	NA	87	<20	0.16	<10	<10	186	<10	NA	45
638205	M-05-106	12	22	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
638206	M-05-106	22	32	0.2	1.88	<2	<10	90	<0.5	<2	1.12	<0.5	46	25	413	8.01	10	1	0.21	10	NA	1.93	651	<1	0.26	99	770	2	0.07	<2	2	NA	NA	114	<20	0.34	<10	<10	448	<10	NA	64
638207	M-05-106	32	42	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
638208	M-05-106	42	52	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
638209	M-05-106	128	138	0.2	1.15	<2	<10	50	<0.5	<2	2.05	<0.5	48	30	749	6.49	10	<1	0.07	40	NA	0.81	427	<1	0.15	67	5690	3	0.89	<2	3	NA	NA	85	<20	0.17	<10	<10	260	<10	NA	57
638210	M-05-106	138	145	0.2	1.24	<2	<10	40	<0.5	<2	0.9	<0.5	31	147	351	4.94	10	<1	0.09	10	NA	0.72	299	<1	0.19	70	1010	3	0.97	<2	3	NA	NA	56	<20	0.14	<10	<10	134	<10	NA	25
638211	M-05-114	10	20	<0.2	0.66	<2	<10	70	2.3	<2	1.01	<0.5	6	3	29	4	<10	<1	0.19	160	NA	0.27	944	3	0.15	4	650	11	0.03	<2	2	NA	NA	30	30	0.09	<10	<10	16	<10	NA	71
638212	M-05-114	20	30	0.2	0.55	<2	<10	70	2.1	<2	0.93	<0.5	9	2	43	8.03	10	<1	0.16	180	NA	0.34	1120	9	0.15	3	690	10	0.05	<2	2	NA	NA	30	30	0.21	<10	<10	66	<10	NA	163
638213	M-05-114	30	40	<0.2	1.19	2	<10	60	3.7	<2	1.52	<0.5	18	2	222	12	10	<1	0.09	280	NA	0.77	1380	10	0.12	6	2280	10	0.09	<2	3	NA	NA	46	50	0.27	<10	<10	82	<10	NA	218
638214	M-05-114	40	50	0.3	0.82	3	<10	50	1.7	<2	1.16	<0.5	11	4	49	5.9	10	<1	0.12	110	NA	0.53	950	3	0.14	4	1130	6	0.05	<2	2	NA	NA	29	30	0.14	<10	<10	39	<10	NA	105
638215	M-05-114	50	60	<0.2	0.8	<2	<10	40	5.6	<2	1.55	<0.5	11	3	79	8.99	10	<1	0.08	340	NA	0.58	1120	11	0.1	4	1290	11	0.04	<2	3	NA	NA	65	60	0.29	<10	<10	62	<10	NA	188
638216	M-05-114	60	70	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
638217	M-06-156	2	12	<0.2	2.45	<2	<10	100	<0.5	2	2.09	<0.5	37	26	77	5.55	<10	<1	0.18	30	NA	2.27	807	<1	0.34	77	1410	<2	0.04	<2	3	NA	NA	184	<20	0.1	<10	<10	117	<10	NA	57
638218	M-06-156	12	22	<0.2	2.42	<2	<10	90	<0.5	2	1.56	<0.5	57	17	156	8.35	<10	<1	0.13	10	NA	3.44	1340	<1	0.38	109	580	<2	0.06	2	2	NA	NA	194	<20	0.14	<10	<10	125	<10	NA	78
638219	M-06-156	22	32	<0.2	2.14	<2	<10	100	<0.5	<2	3.07	<0.5	22	84	192	4.72	10	1	0.24	30	NA	1.3	507	<1	0.32	56	2300	3	0.03	<2	5	NA	NA	179	<20	0.14	<10	<10	223	<10	NA	32
638220	M-06-156	32	42	0.8	2.15	<2	<10	60	<0.5	<2	1.98	<0.5	33	31	1300	4.82	10	1	0.08	10	NA	1.16	430	<1	0.36	86	390	4	0.41	<2	3	NA	NA	168	<20	0.12	<10	<10	179	<10	NA	30
638221	M-06-136	5	15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
638222	M-06-136	15	25	<0.2	1.43	11	20	640	1.2	<2	3.34	<0.5	36	238	167	6.1	10	<1	0.12	70	NA	2.5	658	<1	0.08	146	7850	2	0.28	<2	4	NA	NA	558	<20	0.22	<10	<10	167	<10	NA	53
638223	M-06-136	25	35	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
638224	M-06-136	35	45	0.2	0.9	9	70	10	<0.5	<2	6.28	<0.5	33	205	71	8.39	10	<1	0.04	20	NA	2.44	1970	1	0.04	117	2200	4	0.33	<2	5	NA	NA	92	<20	0.22	<10	<10	129	<10	NA	57
638225	M-05-130	0	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
638226	M-05-130	10	20	0.6	0.71	<2	<10	370	<0.5	<2	5.01	<0.5	62	5	573	17.9	10	<1	0.29	120	NA	2.15	1990	1	0.06	10	>10000	7	0.21	<2	6	NA	NA	169	<20	0.1	10	<10	519	<10	NA	162
638227	M-05-130	20	30	0.2	0.57	<2	<10	170	<0.5	<2	2.62	<0.5	45	20	721	11.5	10	<1																								

Summary of Bulk Metal Content of 2010 Mine Rock Samples

SAMPLE ID	Core	From	To	Ag	Al	As	B	Ba	Be	Bi	Ca	Cd	Co	Cr	Cu	Fe	Ga	Hg	K	La	Li	Mg	Mn	Mo	Na	Ni	P	Pb	S	Sb	Sc	Se	Sn	Sr	Th	Ti	Tl	U	V	W	Y	Zn	
-	-	m	m	ppm	%	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	%	ppm	ppm	%	ppm	ppm	%	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
638261	MB-08-13	60	70	0.3	2.68	<2	<10	90	<0.5	2	1.4	<0.5	54	89	385	7.1	10	<1	0.16	10	NA	3.13	831	<1	0.34	145	460	<2	0.1	<2	2	NA	NA	158	<20	0.18	<10	<10	185	<10	NA	62	
638262	MB-08-13	70	80	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
638263	MB-08-13	80	90	<0.2	1.16	2	<10	20	<0.5	<2	0.8	<0.5	17	128	86	2.12	<10	<1	0.03	<10	NA	0.95	214	<1	0.22	97	310	<2	0.02	<2	1	NA	NA	55	<20	0.13	<10	<10	49	<10	NA	21	
638264	MB-08-13	90	98	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
638265	MB-08-13	168	178	0.2	1.11	3	<10	50	<0.5	<2	1.32	<0.5	19	38	116	4.51	10	<1	0.13	30	NA	0.57	258	<1	0.16	21	3620	<2	0.1	<2	2	NA	NA	65	<20	0.16	<10	<10	244	<10	NA	51	
638266	MB-08-33	20	30	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
638267	MB-08-33	30	38	<0.2	2.36	7	<10	40	<0.5	<2	1.26	<0.5	54	214	252	5.83	10	1	0.06	<10	NA	3.69	691	<1	0.28	362	320	<2	0.46	<2	3	NA	NA	111	<20	0.08	<10	<10	50	<10	NA	60	
638268	MB-08-36	41	51	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
638269	MB-08-36	51	63	<0.2	1.2	3	<10	30	<0.5	<2	0.87	<0.5	19	137	67	4.86	10	1	0.07	10	NA	0.49	373	1	0.24	38	1000	<2	0.09	<2	4	NA	NA	48	<20	0.29	<10	<10	269	<10	NA	58	
638270	M-08-433	8	18	<0.2	0.84	<2	<10	20	<0.5	<2	0.87	<0.5	24	85	267	5.5	10	<1	0.04	<10	NA	0.49	323	<1	0.18	45	730	<2	0.02	2	3	NA	NA	26	<20	0.2	<10	<10	267	<10	NA	48	
638271	M-08-433	18	28	<0.2	1.18	3	<10	20	<0.5	<2	0.88	<0.5	19	95	145	4.79	10	<1	0.04	<10	NA	0.44	255	1	0.24	42	280	<2	0.01	4	3	NA	NA	32	<20	0.23	<10	<10	253	<10	NA	38	
638272	M-08-433	28	38	<0.2	1.72	6	<10	70	<0.5	<2	1.27	<0.5	38	113	123	6.67	10	<1	0.18	10	NA	2.1	661	<1	0.24	59	630	<2	0.02	<2	3	NA	NA	113	<20	0.27	<10	<10	280	<10	NA	52	
638273	M-08-433	38	48	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		
638274	M-08-433	48	58	<0.2	0.97	3	<10	20	<0.5	<2	0.74	<0.5	62	685	203	12.45	10	1	0.06	<10	NA	2.61	1025	1	0.11	145	360	<2	0.03	<2	4	NA	NA	41	<20	0.7	<10	<10	694	<10	NA	74	
638275	M-08-433	58	68	<0.2	0.85	<2	<10	20	<0.5	<2	0.56	<0.5	33	136	36	5.8	<10	1	0.05	<10	NA	1.42	541	<1	0.16	64	100	<2	0.01	<2	2	NA	NA	38	<20	0.3	<10	<10	249	<10	NA	46	
638276	M-08-433	68	78	0.4	1.34	<2	<10	50	<0.5	<2	1.06	<0.5	42	119	638	7.75	10	<1	0.11	10	NA	1.96	672	<1	0.2	79	1370	<2	0.08	2	2	NA	NA	81	<20	0.22	<10	<10	370	<10	NA	51	
638277	M-08-433	78	88	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
638278	M-08-433	88	98	0.2	0.83	3	<10	30	1.2	<2	1.01	<0.5	36	139	63	5	<10	<1	0.09	30	NA	3.47	639	1	0.14	221	220	6	0.02	<2	2	NA	NA	42	<20	0.12	<10	<10	93	<10	NA	55	
638279	M-08-433	98	108	<0.2	1.33	3	<10	100	<0.5	<2	0.95	<0.5	41	139	154	7.28	10	<1	0.24	10	NA	1.92	722	1	0.19	78	1340	<2	0.04	<2	2	NA	NA	80	<20	0.21	<10	<10	303	<10	NA	58	
638280	M-08-433	108	118	0.2	0.95	4	<10	50	<0.5	<2	0.98	<0.5	51	183	427	9.27	10	1	0.09	10	NA	2.8	1005	<1	0.13	111	1210	<2	0.07	2	3	NA	NA	67	<20	0.35	<10	<10	457	<10	NA	83	
638281	M-08-433	118	128	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
638282	M-08-433	128	138	0.4	1.12	9	<10	50	<0.5	<2	0.77	<0.5	105	9	56	12.25	<10	<1	0.11	10	NA	7.91	1975	<1	0.12	232	790	<2	0.02	<2	3	NA	NA	58	<20	0.06	<10	<10	51	<10	NA	123	
638283	M-08-433	138	148	<0.2	1.07	7	<10	40	<0.5	<2	0.68	<0.5	96	6	31	10.55	<10	1	0.07	10	NA	7.54	1730	<1	0.18	270	630	<2	0.01	<2	3	NA	NA	72	<20	0.04	<10	<10	25	<10	NA	103	
638284	M-08-433	148	158	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
638285	M-08-433	158	168	0.2	1.16	<2	<10	50	<0.5	<2	0.92	<0.5	17	84	71	2.64	<10	<1	0.07	10	NA	0.96	345	1	0.22	50	570	<2	0.01	<2	1	NA	NA	85	<20	0.09	<10	<10	82	<10	NA	25	
638286	M-08-433	168	178	<0.2	1.83	2	<10	50	<0.5	<2	1.14	<0.5	63	19	46	7.15	<10	<1	0.08	10	NA	4.59	1100	<1	0.31	168	550	<2	0.02	<2	2	NA	NA	123	<20	0.05	<10	<10	35	<10	NA	71	
638287	M-08-433	178	188	<0.2	1.94	6	<10	80	<0.5	<2	1.31	<0.5	44	213	78	6.29	10	<1	0.23	80	NA	2.99	857	1	0.35	123	540	2	0.03	<2	2	NA	NA	127	<20	0.15	<10	<10	117	<10	NA	73	
638288	M-08-433	188	198	<0.2	1.86	<2	<10	50	0.7	<2	1.64	<0.5	32	168	171	5.37	<10	1	0.1	70	NA	1.76	756	2	0.26	95	690	4	0.05	<2	3	NA	NA	131	<20	0.18	<10	<10	169	<10	NA	82	
638289	M-08-433	198	208	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
638290	M-08-463	3	13	0.2	1.05	<2	<10	110	<0.5	<2	4.93	<0.5	42	28	656	8.71	10	1	0.24	120	NA	1.61	1020	1	0.05	38	>10000	8	0.1	<2	3	NA	NA	135	<20	0.2	<10	<10	367	<10	NA	100	
638291	M-08-463	13	23	0.6	1.07	<2	<10	130	1.4	<2	0.94	<0.5	58	99	918	12.35	10	1	0.37	30	NA	1.91	1020	1	0.11	95	1920	16	0.13	<2	3	NA	NA	35	<20	0.66	<10	<10	747	<10	NA	117	
638292	M-08-463	23	33	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
638293	M-08-463	33	43	0.2	1.33	<2	<10	50	<0.5	<2	0.71	<0.5	36	156	85	7.18	10	<1	0.09	<10	NA	1.16	419	<1	0.18	86	490	<2	<0.01	<2	2	NA	NA	58	<20	0.32	<10	<10	378	<10	NA	50	
638294	M-08-463	43	53	0.4	1.23	2	<10	60	<0.5	2	0.87	<0.5	48	252	439	9.81	10	<1	0.18	10	NA	1.89	553	<1	0.16	154	920	2	0.05	<2	2	NA	NA	75	<20	0.36	<10	<10	622	<10	NA	67	
638295	M-08-463	53	63	<0.2	1.67	3	<10	30	<0.5	<2	0.94	<0.5	28	68	316	6.83	10	<1	0.06	<10	NA	0.33	280	<1	0.3	55	290	<2	0.01	<2	3	NA	NA	49	<20	0.28	<10	<10	391	<10	NA	50	
638296	M-08-463	63	73	<0.2	1.71	<2	<10	20	<0.5	<2	1.03	<0.5	20	65	56	4.92	10	<1	0.03	<10	NA	0.19	224	<1	0.31</																		

Summary of ABA and Bulk Metal Content Results from 2007 Samples

Summary of ABA Results for 2007 Samples

SAMPLE ID	Core	From	To	pH	NP	AP	NP/AP	Total S	Sulphide S	C	Carb-NP
-	-	m	m	Unity	kg CaCO3/t	kg CaCO3/t	Unity	%	%	%	kg CaCO3/t
MAR07-01	M-07-312	87	98	9.85	31.4	2.4	13.1	0.076	0.08	0.026	2.17
MAR07-02	M-07-213	157	165	9.75	29.4	1.1	26.2	0.058	0.04	0.249	20.75
MAR07-03	M-06-202	1.5	10.5	9.8	27.7	3.1	9.04	0.142	0.1	0.105	8.75
MAR07-04	M-06-202	10.5	19.4	9.88	25.5	0.94	27.1	0.03	0.03	0.16	13.33
MAR07-05	M-06-202	36	45	9.93	14.5	0.31	46.6	0.005	0.01	0.13	10.83
MAR07-06	M-06-202	67	75	9.9	25	0.31	80.6	0.017	0.01	0.218	18.17
MAR07-07	M-06-202	72	80.1	9.96	14.1	0.31	45.6	0.009	0.01	0.043	3.58
MAR07-08	M-06-202	81.55	86.1	9	42.9	0.31	139	0.006	0.01	0.041	3.42
MAR07-09	M-06-202	86.1	88.7	9.97	48.4	0.31	156	0.018	0.01	0.051	4.25
MAR07-10	M-06-202	90.3	99	8.86	44.1	0.31	142	0.006	0.01	0.034	2.83
MAR07-100	M-06-227	275	280	9.54	17.3	20.6	0.84	0.853	0.66	0.103	8.58
MAR07-101	M-06-227	288	297	9.76	15.5	36.3	0.43	1.27	1.16	0.089	7.42
MAR07-102	M-06-231	0	9.4	9.75	17.4	0.31	55.6	0.135	0.01	0.049	4.08
MAR07-103	M-06-231	13	25	9.86	48	2.8	17.2	0.228	0.09	0.197	16.42
MAR07-104	M-06-231	35	44	9.95	71.3	0.31	230	0.115	0.01	0.473	39.42
MAR07-105	M-06-231	56	63	10.08	20.8	0.31	67.1	0.082	0.01	0.144	12.00
MAR07-106	M-06-231	68	76	9.92	0.38	0.31	1.22	0.069	0.01	0.246	20.50
MAR07-109	M-06-231	124	133	9.56	53.2	0.31	172	0.024	0.01	0.508	42.34
MAR07-11	M-06-202	99	104	10.05	21.3	0.31	68.8	0.006	0.01	0.008	0.67
MAR07-111	M-06-231	257	261	9.27	19.8	0.94	21.1	0.159	0.03	0.084	7.00
MAR07-112	M-06-233	9	18	9.67	9.7	0.31	31.1	0.028	0.01	0.028	2.33
MAR07-113	M-06-233	39	48	9.62	46.8	4.7	9.98	0.443	0.15	0.053	4.42
MAR07-114	M-06-233	161	169	9.91	40.4	0.31	130	0.11	0.01	0.15	12.50
MAR07-12	M-06-202	104	109	9.93	44.9	0.31	145	0.005	0.01	0.012	1.00
MAR07-13	M-06-202	109	123	9.46	33.2	2.8	11.7	0.129	0.09	0.427	35.59
MAR07-14	M-06-202	124	138	9.9	45.1	0.3	144.0	0.0	0.0	0.5	43.17
MAR07-15	M-06-202	316	321	9.12	25.9	110	0.24	3.73	3.52	0.234	19.50
MAR07-16	M-06-202	321	324	9.25	18.2	126	0.15	4.37	4.02	0.121	10.08
MAR07-17	M-06-202	323	339	9.54	32.8	6.6	4.98	0.341	0.21	0.299	24.92
MAR07-18	M-06-222	26	37	9.78	38.4	2.8	13.5	0.193	0.09	0.207	17.25
MAR07-19	M-06-222	55	66	9.67	59.9	3.2	18.8	0.234	0.1	0.175	14.58
MAR07-20	M-06-222	83	87.9	9.26	38.2	0.94	40.7	0.099	0.03	0.402	33.50
MAR07-21	M-06-222	96	108	9.81	41.2	2.1	19.4	0.17	0.07	0.182	15.17
MAR07-22	M-06-223	4	7.6	9.24	39	0.62	62.8	0.063	0.02	0.246	20.50
MAR07-23	M-06-223	12.7	21.5	9.53	30.9	1.9	16.3	0.101	0.06	0.092	7.67
MAR07-24	M-06-223	39	47	9.79	21.1	0.31	68.1	0.016	0.01	0.079	6.58
MAR07-25	M-06-223	78.2	87	9.72	22.3	2.9	7.69	0.146	0.09	0.038	3.17
MAR07-26	M-06-223	93	104.6	9.6	26.3	0.31	84.7	0.022	0.01	0.579	48.25
MAR07-27	M-06-223	243	251	9.2	21.6	17	1.27	0.82	0.54	0.085	7.08
MAR07-28	M-06-223	156.7	165.1	9.71	44.7	0.62	72.1	0.035	0.02	0.026	2.17
MAR07-29	M-06-223	165	174	9.83	30.8	0.31	99.5	0.027	0.01	0.074	6.17
MAR07-30	M-06-223	177	186	9.66	44.6	0.31	144	0.005	0.01	0.201	16.75
MAR07-31	M-06-223	200	208	9.62	42.7	0.31	138	0.027	0.01	0.349	29.09
MAR07-32	M-06-223	217	226	9.25	43.1	1.6	26.9	0.126	0.05	0.409	34.09
MAR07-33	M-06-223	277	288	9	36.1	51	0.71	1.99	1.63	0.288	24.00
MAR07-34	M-06-224	49.5	58.1	9.85	11.4	0.31	36.8	0.012	0.01	0.047	3.92
MAR07-35	M-06-224	183.4	192.2	9.82	34.7	0.31	112	0.041	0.01	0.204	17.00

Summary of ABA Results for 2007 Samples

SAMPLE ID	Core	From	To	pH	NP	AP	NP/AP	Total S	Sulphide S	C	Carb-NP
-	-	m	m	Unity	kg CaCO3/t	kg CaCO3/t	Unity	%	%	%	kg CaCO3/t
MAR07-36	M-06-224	15	23.9	9.61	23.7	2.5	9.5	0.186	0.08	0.086	7.17
MAR07-37	M-06-225	0	9.5	9.6	13.7	0.31	44.3	0.011	0.01	0.224	18.67
MAR07-38	M-06-225	39	48.7	9.83	34	0.31	110	0.034	0.01	0.2	16.67
MAR07-39	M-06-225	57	66	9.79	30.7	0.31	99	0.036	0.01	0.171	14.25
MAR07-40	M-06-225	67.75	69.75	9.51	41.5	0.31	134	0.005	0.01	0.431	35.92
MAR07-41	M-06-225	159	164	9.83	25.9	0.62	41.5	0.008	0.02	0.15	12.50
MAR07-42	M-06-225	168	171	9.73	40.2	0.62	64.8	0.02	0.02	0.162	13.50
MAR07-43	M-06-225	71	79	9.78	30.3	0.62	48.9	0.028	0.02	0.236	19.67
MAR07-44	M-06-225	79	88	9.88	13.4	0.31	43.2	0.009	0.01	0.103	8.58
MAR07-45	M-06-225	105	107	9.92	26.3	0.62	42.4	0.042	0.02	0.242	20.17
MAR07-46	M-06-225	108	118	9.86	33.2	1.2	27.7	0.079	0.04	0.2	16.67
MAR07-47	M-06-225	175	188	9.75	41.1	0.31	132.58	0.047	0.01	0.166	13.83
MAR07-48	M-06-225	192	201	9.81	27.8	0.62	44.8	0.051	0.02	0.19	15.83
MAR07-49	M-06-225	228	232	9.52	28.4	22.1	1.28	0.986	0.71	0.176	14.67
MAR07-50	M-06-226	28	33	9.56	33.2	0.62	53.5	0.024	0.02	0.02	1.67
MAR07-51	M-06-226	68	72	9.26	27.5	0.31	88	0.014	0.01	0.068	5.67
MAR07-52	M-06-226	138	147	9.73	22.9	0.31	73.9	0.013	0.01	0.126	10.50
MAR07-53	M-06-220	6.9	11.2	9.87	19.3	0.31	62.1	0.019	0.01	0.04	3.33
MAR07-54	M-06-220	12	20	9.87	18.4	0.31	59.3	0.031	0.01	0.039	3.25
MAR07-55	M-06-220	24	37	9.83	20.7	0.31	66.8	0.018	0.01	0.056	4.67
MAR07-56	M-06-220	37	50	9.98	34.5	0.31	111	0.019	0.01	0.037	3.08
MAR07-57	M-06-220	106	120	10.06	26.5	0.31	85.4	0.005	0.01	0.032	2.67
MAR07-58	M-06-220	53	59	10.01	35.8	0.31	115	0.058	0.01	0.064	5.33
MAR07-59	M-06-220	135	141	9.81	71.1	0.31	229	0.017	0.01	0.047	3.92
MAR07-60	M-06-220	141	159	9.96	36.5	0.31	118	0.014	0.01	0.045	3.75
MAR07-61	M-06-220	163	165	10.07	34.1	0.31	110	0.008	0.01	0.044	3.67
MAR07-62	M-06-220	165	175	10.03	60.1	0.31	194	0.006	0.01	0.06	5.00
MAR07-63	M-06-220	175	188	9.87	38.8	7.9	4.91	0.472	0.25	0.472	39.34
MAR07-64	M-06-220	232	240	9.95	35.5	3.8	9.32	0.275	0.12	0.131	10.92
MAR07-65	M-06-220	240	250	9.57	120	0.31	387	0.08	0.01	0.076	6.33
MAR07-66	M-06-220	302	310	9.09	19.4	25.6	0.76	1.06	0.82	0.087	7.25
MAR07-67	M-07-309	91	100	9.94	31	0.62	50	0.054	0.02	0.129	10.75
MAR07-68	M-07-309	100	108	9.94	27.7	0.62	44.4	0.086	0.02	0.079	6.58
MAR07-69	M-07-309	113	123	9.86	49	0.31	158	0.005	0.01	0.425	35.42
MAR07-70	M-07-306	58	71	10.22	49.6	0.31	160	0.036	0.01	0.049	4.08
MAR07-71	M-07-319	2.88	11.5	9.89	21.6	0.31	69.6	0.059	0.01	0.066	5.50
MAR07-72	M-07-319	11.5	20	9.82	32	0.62	51.7	0.077	0.02	0.252	21.00
MAR07-73	M-07-319	20	30	9.19	36.5	0.31	118	0.026	0.01	0.433	36.09
MAR07-74	M-07-319	76	84	10.15	75.6	0.31	244	0.007	0.01	0.189	15.75
MAR07-75	M-06-160	28	37	9.23	65.6	4.5	14.6	0.369	0.14	0.858	71.50
MAR07-76	M-06-160	41	50	9.88	20.1	3.9	5.15	0.262	0.12	0.036	3.00
MAR07-77	M-06-160	53	63	9.63	34.8	1.6	21.7	0.116	0.05	0.155	12.92
MAR07-78	M-06-153	5	15	10.09	6	0.31	19.4	0.005	0.01	0.02	1.67
MAR07-79	M-06-153	31	40	9.72	59.3	4.4	13.6	0.275	0.14	0.098	8.17
MAR07-80	M-06-153	53	62	9.66	47.3	6	7.89	0.345	0.19	0.093	7.75
MAR07-81	M-06-155	14	22	9.7	56.2	5.6	9.99	0.323	0.18	0.148	12.33
MAR07-82	M-06-160	76	84	9.75	42.8	0.94	45.5	0.106	0.03	0.151	12.58

Summary of ABA Results for 2007 Samples

SAMPLE ID	Core	From	To	pH	NP	AP	NP/AP	Total S	Sulphide S	C	Carb-NP
-	-	m	m	Unity	kg CaCO3/t	kg CaCO3/t	Unity	%	%	%	kg CaCO3/t
MAR07-83	M-06-152	23	32	10.08	39.4	0.31	127	0.005	0.01	0.073	6.08
MAR07-84	M-06-150	5	14	9.95	34.2	0.31	110	0.011	0.01	0.062	5.17
MAR07-85	M-06-150	23	31	9.97	44.3	0.31	143	0.005	0.01	0.061	5.08
MAR07-86	M-06-152	5	14	9.72	30.9	0.31	99.6	0.008	0.01	0.058	4.83
MAR07-87	M-06-210	15	19	9.86	46.6	0.31	150	0.006	0.01	0.083	6.92
MAR07-88	M-06-210	19	32	9.82	27.9	0.31	89.9	0.009	0.01	0.09	7.50
MAR07-89	M-06-210	80	87	9.87	40.7	3.4	11.8	0.225	0.11	0.153	12.75
MAR07-90	M-06-210	87	98	9.92	28.2	0.31	90.9	0.047	0.01	0.171	14.25
MAR07-91	M-06-227	10	15	9.65	40.1	2.7	14.7	0.195	0.09	0.109	9.08
MAR07-92	M-06-227	28	33	9.44	19.5	0.31	63	0.005	0.01	0.183	15.25
MAR07-93	M-06-228	58	66	9.81	40.2	1.6	25.2	0.09	0.05	0.254	21.17
MAR07-94	M-06-228	66	75	9.9	29.9	0.31	96.5	0.009	0.01	0.25	20.83
MAR07-95	M-06-227	105	114	9.98	8.8	0.31	28.5	0.005	0.01	0.05	4.17
MAR07-96	M-06-227	301	310	9.48	19.9	198	0.1	6.71	6.34	0.107	8.92
MAR07-97	M-06-227	219	222	9.88	65.4	0.31	211	0.017	0.01	0.18	15.00
MAR07-98	M-06-227	223	232	9.74	51	0.31	164	0.011	0.01	0.503	41.92
MAR07-99	M-07-306	124	133	9.72	39.6	11.3	3.5	0.519	0.36	0.292	24.33
MAR07-107	M-06-231	184	192	9.81	63.8	17.2	3.7	0.754	0.55	0.032	2.67
MAR07-108	M-06-231	84	102	9.39	44.6	1.6	27.9	0.235	0.05	0.373	31.09
MAR07-110	M-06-231	248	257	8.94	24.8	302	0.08	9.68	9.67	0.081	6.75

Summary of Bulk Metal Content for 2007 Samples

SAMPLE ID -	Core	From m	To m	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	Li ppm	Mg %	Mn ppm	Mo ppm	Na %	Ni ppm	P ppm	Pb ppm	S %	Sb ppm	Sc ppm	Se ppm	Sn ppm	Sr ppm	Th ppm	Ti %	Tl ppm	U ppm	V ppm	W ppm	Y ppm	Zn ppm
MAR07-01	M-07-312	87	98	0.28	6.2	13	NA	270	0.3	0.06	5.1	0.17	100	290	400	16	NA	NA	0.37	NA	2.5	7	1900	1.5	NA	230	NA	3.5	NA	4	NA	0.5	0.9	390	NA	0.61	0.05	0.33	460	NA	8.2	160
MAR07-02	M-07-213	157	165	0.52	8.5	7	NA	380	1.8	0.2	7.2	0.16	37	100	560	7.7	NA	NA	0.84	NA	6	2.6	880	2.5	NA	92	NA	11	NA	1.2	NA	1	1	570	NA	0.37	0.1	1.8	450	NA	19	92
MAR07-03	M-06-202	1.5	10.5	0.45	6.9	1	NA	290	0.5	0.11	6	0.23	83	540	750	16	NA	NA	0.49	NA	2.5	4.5	1500	1.2	NA	190	NA	5	NA	0.8	NA	0.5	1.1	320	NA	0.9	0.05	0.45	640	NA	10	140
MAR07-04	M-06-202	10.5	19.4	0.26	7.8	1	NA	320	0.4	0.08	7.4	0.32	58	350	200	12	NA	NA	0.48	NA	2.5	4.5	1300	0.81	NA	140	NA	3	NA	0.8	NA	0.5	1.7	420	NA	0.54	0.05	0.57	390	NA	11	98
MAR07-05	M-06-202	36	45	0.18	7.9	1	NA	340	0.4	0.03	6.7	0.33	38	140	42	7.3	NA	NA	0.5	NA	2.5	3	970	0.48	NA	63	NA	4.6	NA	0.4	NA	0.5	1.3	290	NA	0.3	0.05	0.3	230	NA	13	73
MAR07-06	M-06-202	67	75	1.6	7.9	1	NA	230	0.4	0.03	7.2	0.11	49	560	130	9	NA	NA	0.34	NA	2.5	4.4	1100	0.54	NA	160	NA	2.8	NA	0.3	NA	0.5	0.5	370	NA	0.47	0.05	0.16	340	NA	9.2	97
MAR07-07	M-06-202	72	80.1	0.1	8.6	1	NA	180	0.3	0.01	7.6	0.14	42	420	42	8	NA	NA	0.31	NA	2.5	4.3	1000	0.48	NA	140	NA	2.2	NA	0.2	NA	0.5	0.5	390	NA	0.52	0.05	0.11	260	NA	11	81
MAR07-08	M-06-202	81.55	86.1	0.07	5.6	1	NA	210	0.2	0.01	3	0.07	150	130	34	25	NA	NA	0.23	NA	6	8.1	2500	7	NA	290	NA	1.4	NA	0.2	NA	0.5	0.6	390	NA	1.4	0.05	0.08	1400	NA	2.4	200
MAR07-09	M-06-202	86.1	88.7	0.15	5.1	1	NA	330	0.5	0.05	3.4	0.2	140	220	91	21	NA	NA	0.51	NA	11	9.6	2800	1.4	NA	280	NA	3.9	NA	0.3	NA	1	1	360	NA	0.54	0.05	0.75	350	NA	14	220
MAR07-10	M-06-202	90.3	99	0.09	4.8	1	NA	210	0.2	0.02	3.2	0.08	140	170	31	21	NA	NA	0.24	NA	7	11	2700	0.55	NA	330	NA	2.4	NA	0.2	NA	0.5	0.4	350	NA	0.5	0.05	0.19	420	NA	4.2	180
MAR07-100	M-06-227	275	280	0.88	7.8	1	NA	370	0.5	0.41	7	0.46	62	110	1300	7.8	NA	NA	0.51	NA	2.5	2.9	1100	0.47	NA	140	NA	10	NA	0.05	NA	2	0.8	610	NA	0.32	0.05	0.79	290	NA	12	80
MAR07-101	M-06-227	288	297	0.66	8	1	NA	260	1.5	0.16	5.5	0.26	66	160	880	7	NA	NA	0.74	NA	14	3.2	1100	1.1	NA	180	NA	7.7	NA	0.05	NA	1	1.1	600	NA	0.2	0.05	1.7	130	NA	20	100
MAR07-102	M-06-231	0	9.4	0.15	7.3	1	NA	280	0.5	0.07	5.9	0.13	46	220	180	7.6	NA	NA	0.61	NA	2.5	3.5	1100	0.6	NA	140	NA	2.8	NA	0.05	NA	0.5	0.6	430	NA	0.73	0.05	0.25	250	NA	12	100
MAR07-103	M-06-231	13	25	0.2	6.8	1	NA	270	0.8	0.14	4.7	0.13	43	180	85	6.3	NA	NA	0.98	NA	2.5	3.5	1000	1.2	NA	200	NA	6.7	NA	0.05	NA	0.5	0.9	300	NA	0.42	0.05	0.67	180	NA	18	100
MAR07-104	M-06-231	35	44	0.17	7.2	1	NA	180	1.3	0.17	5.7	0.13	21	51	96	3.5	NA	NA	0.97	NA	6	1.6	730	1.8	NA	36	NA	6.7	NA	0.05	NA	0.5	1.4	240	NA	0.29	0.05	0.87	100	NA	15	76
MAR07-105	M-06-231	56	63	0.17	7.6	1	NA	570	1.4	0.14	3.5	0.12	19	75	68	3.4	NA	NA	1.6	NA	6	1.5	720	3.4	NA	42	NA	7.5	NA	0.2	NA	0.5	1.2	530	NA	0.31	0.05	0.95	93	NA	16	84
MAR07-106	M-06-231	68	76	0.3	8.8	1	NA	380	0.5	0.09	8	0.12	40	130	630	5.7	NA	NA	0.54	NA	2.5	3.7	890	0.76	NA	130	NA	3.6	NA	0.05	NA	0.5	1	570	NA	0.23	0.05	0.7	160	NA	11	62
MAR07-109	M-06-231	124	133	0.2	9.4	1	NA	410	0.5	0.03	8.1	0.11	28	62	210	5.4	NA	NA	0.59	NA	2.5	2.5	800	0.65	NA	37	NA	2.9	NA	0.05	NA	0.5	0.4	810	NA	0.38	0.05	0.47	280	NA	12	53
MAR07-11	M-06-202	99	104	0.14	11	1	NA	560	0.7	0.01	7.1	0.12	40	74	62	7.2	NA	NA	0.68	NA	17	3.1	1000	0.84	NA	82	NA	3.5	NA	0.1	NA	0.5	0.6	810	NA	0.27	0.05	0.59	160	NA	11	73
MAR07-111	M-06-231	257	261	0.33	6.9	2	NA	360	1.1	0.1	3.4	0.08	26	89	100	4.7	NA	NA	1.5	NA	2.5	2	820	1.3	NA	74	NA	8.4	NA	0.05	NA	0.5	1.6	420	NA	0.46	0.05	1.4	140	NA	18	67
MAR07-112	M-06-233	9	18	0.13	7	1	NA	270	0.6	0.09	6	0.16	52	93	160	9.2	NA	NA	0.65	NA	2.5	3.5	1300	0.84	NA	110	NA	6	NA	0.05	NA	0.5	0.8	220	NA	0.55	0.05	0.56	280	NA	24	110
MAR07-113	M-06-233	39	48	1.1	1.8	1	NA	140	0.2	0.34	7.3	0.38	130	250	2200	29	NA	NA	0.14	NA	2.5	4.5	2800	1.2	NA	190	NA	11	NA	0.05	NA	2	1.3	240	NA	0.65	0.05	0.75	1600	NA	65	280
MAR07-114	M-06-233	161	169	0.35	3.7	1	NA	310	1.2	0.45	9	0.25	66	84	500	13	NA	NA	0.66	NA	2.5	4.8	2200	1.6	NA	110	NA	9.7	NA	0.05	NA	2	1.3	290	NA	0.54	0.05	2.6	340	NA	57	160
MAR07-12	M-06-202	104	109	0.1	8.3	1	NA	390	0.8	0.03	5	0.08	87	75	38	12	NA	NA	0.71	NA	19	7.6	1800	0.91	NA	230	NA	4.5	NA	0.3	NA	0.5	0.9	550	NA	0.13	0.05	0.88	67	NA	13	110
MAR07-13	M-06-202	109	123	1.1	5.8	1	NA	520	1.1	0.12	4.5	0.56	11	60	77	10	NA	NA	2.7	NA	27	0.73	2900	12	NA	21	NA	23	NA	0.5	NA	0.5	5.8	180	NA	0.23	0.4	14	48	NA	160	270
MAR07-14	M-06-202	124	138	0.28	7.8	1	NA	400	1.4	0.06	7.6	0.17	35	160	110	8.6	NA	NA	0.85	NA	23	3.2	1300	2.3	NA	92	NA	5.1	NA	0.3	NA	0.5	1.8	490	NA	0.4	0.05	1.5	270	NA	30	100
MAR07-15	M-06-202	316	321	2.4	6.9	1	NA	320	0.6	0.61	7.8	0.73	110	120	7300	14	NA	NA	0.41	NA	2.5	3.1	1100	2	NA	490	NA	18	NA	0.2	NA	2	1.3	490	NA	0.33	0.05	0.35	350	NA	13	95
MAR07-16	M-06-202	321	324	1	7.2	1	NA	310	0.8	0.2	6	0.45	81	140	5700	9.7	NA	NA	0.79	NA	9	2.3	1100	1.7	NA	390	NA	9.2	NA	0.1	NA	2	0.8	420	NA	0.17	0.05	0.32	130	NA	15	86
MAR07-17	M-06-202	323	339	0.78	7.7	1	NA	440	0.9	0.18	4.9	0.19	16	190	380	3.4	NA	NA	1.3	NA	15	1.2	770	2	NA	50	NA	8.9	NA	1.2	NA	0.5	1.5	400	NA	0.21	0.4	1	74	NA	12	60
MAR07-18	M-06-222	26	37	0.2	5.5	1	NA	780	0.9	0.14	8	0.26	56	99	370	16	NA	NA	0.87	NA	2.5	3	1800	2.5	NA	59	NA	8.8	NA	0.7	NA	1	1.3	440	NA	1.5	0.2	1.5	340	NA	48	170
MAR07-19	M-06-222	55	66	0.47	3.3	1	NA	380	0.5	0.2	6.8	0.31	110	410	760	24	NA	NA	0.44	NA	8	5.5	2300	2.2	NA	260	NA	8.1	NA	0.3	NA	2	1.2	290	NA	1.8	0.1	0.9	780	NA	46	230
MAR07-20	M-06-222	83	87.9	0.36	5.2	1	NA	540	3.2	0.08	3.7	0.26	12	120	66	11	NA	NA	2.7	NA	11	0.56	2200	11	NA	28	NA	12	NA	0.4	NA	0.5	3.1	130	NA	0.76	0.3	5.4	60	NA	56	280
MAR07-21	M-06-222	96	108	0.43	3	1	NA	580	0.7	0.24	7.6	0.3	80	160	370	21	NA	NA	0.66	NA	8	5.1	2500	2.9	NA	150	NA	5.6	NA	0.2	NA	1	1.3	230	NA	1.6	0.05	0.76	510	NA	33	220
MAR07-22	M-06-223	4	7.6	0.23	9.2	1	NA	830	1	0.06	7.5	0.16	37	100	320	8.2	NA	NA	0.87	NA	10	2.2	1100	1.4	NA	32	NA	6.2	NA	0.1	NA	1	0.9	820	NA	0.5	0.1	0.93	240	NA	25	93
MAR07-23	M-06-223	12.7	21.5	0.28	6.6	1	NA	630	0.9	0.05	8.3	0.17	68	56	530	15	NA	NA	0.7	NA	9	3	1700	2.3	NA	68	NA	5.2	NA	0.05	NA	2	1	680	NA	0.89	0.05	1.1	610	NA	51	160
MAR07-24	M-06-223	39	47	0.11	7.9	1	NA	190	0.3	0.005	8	0.13	63	130	120	11	NA	NA	0.27	NA	2.5	4.5	1400	0.47	NA	110	NA	1	NA	0.05	NA	1	0.9	310	NA							

Summary of Bulk Metal Content for 2007 Samples

SAMPLE ID -	Core	From m	To m	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	Li ppm	Mg %	Mn ppm	Mo ppm	Na %	Ni ppm	P ppm	Pb ppm	S %	Sb ppm	Sc ppm	Se ppm	Sn ppm	Sr ppm	Th ppm	Ti %	Tl ppm	U ppm	V ppm	W ppm	Y ppm	Zn ppm
MAR07-47	M-06-225	175	188	0.22	7.6	1	NA	280	1	0.01	7	0.1	63	190	350	9.1	NA	NA	0.54	NA	2.5	5.2	1300	0.48	NA	170	NA	2.9	NA	0.05	NA	0.5	0.9	520	NA	0.34	0.05	0.99	220	NA	13	91
MAR07-48	M-06-225	192	201	0.22	6.5	1	NA	270	0.4	0.03	8.4	0.12	70	610	310	11	NA	NA	0.31	NA	2.5	6.5	1400	0.4	NA	260	NA	1.9	NA	0.05	NA	0.5	0.5	450	NA	0.41	0.05	0.32	280	NA	12	95
MAR07-49	M-06-225	228	232	1.8	7.2	1	NA	260	0.3	0.26	8.8	0.41	63	290	3500	7.2	NA	NA	0.36	NA	2.5	4	920	0.46	NA	300	NA	8.3	NA	0.1	NA	2	0.9	510	NA	0.28	0.05	0.29	200	NA	11	66
MAR07-50	M-06-226	28	33	0.18	5.9	1	NA	240	0.3	0.03	3.8	0.16	99	520	130	19	NA	NA	0.23	NA	2.5	6.1	1900	0.37	NA	490	NA	1.5	NA	0.4	NA	2	0.6	450	NA	0.57	0.05	0.3	230	NA	17	140
MAR07-51	M-06-226	68	72	0.25	3.8	4	NA	290	1.9	0.07	6	0.16	34	140	54	13	NA	NA	0.31	NA	13	9	820	1.1	NA	360	NA	7	NA	0.6	NA	2	1.7	260	NA	0.48	0.2	2.2	120	NA	17	91
MAR07-52	M-06-226	138	147	0.18	7.6	1	NA	380	0.3	0.005	5.4	0.12	50	180	190	4.6	NA	NA	1.4	NA	2.5	2.4	1300	0.32	NA	72	NA	1.7	NA	0.05	NA	0.5	0.6	390	NA	0.46	0.05	0.12	280	NA	12	80
MAR07-53	M-06-220	6.9	11.2	0.07	7.2	1	NA	320	0.6	0.005	8.3	0.1	54	140	95	8.4	NA	NA	0.34	NA	2.5	4.6	1200	0.32	NA	92	NA	1.9	NA	0.05	NA	1	0.6	490	NA	0.5	0.05	0.52	310	NA	11	84
MAR07-54	M-06-220	12	20	0.17	8.6	1	NA	410	0.6	0.03	7.9	0.25	57	280	120	9.4	NA	NA	0.58	NA	2.5	4.4	1400	1.2	NA	89	NA	4.2	NA	0.2	NA	0.5	3.5	590	NA	0.62	0.05	0.51	310	NA	16	110
MAR07-55	M-06-220	24	37	0.08	7.2	1	NA	340	0.4	0.02	7.3	0.16	55	420	110	10	NA	NA	0.51	NA	2.5	4.6	1200	0.32	NA	190	NA	1.8	NA	0.05	NA	1	0.7	350	NA	0.52	0.05	0.19	240	NA	12	90
MAR07-56	M-06-220	37	50	0.05	6.7	1	NA	280	0.4	0.005	7.2	0.15	55	390	71	8.9	NA	NA	0.4	NA	2.5	5.2	1300	1.7	NA	180	NA	1.8	NA	0.05	NA	0.5	0.7	400	NA	0.65	0.05	0.18	290	NA	13	100
MAR07-57	M-06-220	106	120	0.27	7.2	1	NA	260	0.5	0.06	6.9	0.15	63	230	290	9.4	NA	NA	0.45	NA	2.5	4.9	1500	1	NA	140	NA	3.4	NA	3.2	NA	0.5	2	380	NA	0.9	0.3	0.64	400	NA	16	120
MAR07-58	M-06-220	53	59	0.09	5.9	1	NA	320	0.5	0.005	6.1	0.11	160	79	72	12	NA	NA	0.57	NA	10	4.8	3000	0.99	NA	320	NA	1.6	NA	0.5	NA	1	1	380	NA	0.44	0.2	0.52	280	NA	8.8	200
MAR07-59	M-06-220	135	141	0.09	4	1	NA	220	0.5	0.01	2.8	0.09	160	78	72	20	NA	NA	0.43	NA	11	10	3100	0.96	NA	320	NA	1.6	NA	0.4	NA	1	1	280	NA	0.44	0.2	0.51	280	NA	8.7	200
MAR07-60	M-06-220	141	159	0.07	7.9	1	NA	400	0.4	0.06	5.9	0.09	79	87	73	12	NA	NA	0.49	NA	2.5	6.1	1800	0.62	NA	180	NA	1.6	NA	0.3	NA	1	0.6	600	NA	0.26	0.1	0.48	170	NA	10	110
MAR07-61	M-06-220	163	165	0.07	7.9	1	NA	430	0.4	0.005	6.9	0.1	71	150	67	10	NA	NA	0.5	NA	2.5	5.9	1600	0.48	NA	160	NA	1.5	NA	0.1	NA	0.5	0.5	620	NA	0.34	0.05	0.36	190	NA	9.8	100
MAR07-62	M-06-220	165	175	0.05	9.5	1	NA	330	0.4	0.005	6.2	0.08	81	91	37	11	NA	NA	0.39	NA	2.5	6.9	1600	0.31	NA	210	NA	1.2	NA	0.1	NA	0.5	0.4	640	NA	0.13	0.05	0.31	63	NA	4.9	89
MAR07-63	M-06-220	175	188	1.6	8.5	1	NA	410	0.5	0.26	9.2	0.42	45	130	2700	6.6	NA	NA	0.54	NA	2.5	3.5	910	0.6	NA	240	NA	4.5	NA	0.05	NA	3	1	620	NA	0.37	0.1	0.45	230	NA	14	75
MAR07-64	M-06-220	232	240	0.43	6.7	1	NA	340	0.5	0.13	9.4	0.24	54	140	780	8.4	NA	NA	0.43	NA	2.5	4.4	1300	0.4	NA	120	NA	4	NA	0.05	NA	2	0.8	560	NA	0.42	0.05	0.55	260	NA	17	75
MAR07-65	M-06-220	240	250	0.19	2.9	1	NA	140	0.3	0.03	5.2	0.11	100	1150	270	11	NA	NA	0.16	NA	2.5	12	1500	0.45	NA	1050	NA	1.5	NA	0.1	NA	0.5	0.8	200	NA	0.5	0.05	0.2	170	NA	12	120
MAR07-66	M-06-220	302	310	0.29	7.1	1	NA	360	1.1	0.13	4.6	0.18	26	170	580	6	NA	NA	0.7	NA	7	1.7	1700	1.8	NA	66	NA	4.2	NA	0.3	NA	0.5	1.1	440	NA	0.28	0.1	0.64	92	NA	13	77
MAR07-67	M-07-309	91	100	0.25	8.2	1	NA	320	0.4	0.03	8.1	0.12	59	76	390	10	NA	NA	0.43	NA	2.5	4.3	1100	0.58	NA	110	NA	1.8	NA	0.05	NA	1	0.8	560	NA	0.59	0.05	0.53	600	NA	10	82
MAR07-68	M-07-309	100	108	1.5	7.6	1	NA	300	0.4	0.11	8.4	0.13	59	110	1000	10	NA	NA	0.39	NA	2.5	4.4	1200	0.54	NA	100	NA	2.1	NA	0.05	NA	1	0.6	570	NA	0.66	0.05	0.39	650	NA	11	78
MAR07-69	M-07-309	113	123	0.07	7.3	1	NA	310	0.5	0.06	8.3	0.12	51	110	380	8.5	NA	NA	0.49	NA	2.5	4.1	1200	0.31	NA	93	NA	1.4	NA	0.1	NA	1	0.6	770	NA	0.5	0.05	0.4	400	NA	10	72
MAR07-70	M-07-306	58	71	0.47	6.4	1	NA	350	0.5	0.07	6.5	0.12	73	550	460	12	NA	NA	0.47	NA	2.5	6.2	1600	1.7	NA	300	NA	2.2	NA	0.7	NA	0.5	7.7	430	NA	0.76	0.05	0.45	380	NA	13	120
MAR07-71	M-07-319	2.88	11.5	0.24	6.7	1	NA	290	0.6	0.12	7.2	0.15	62	370	450	12	NA	NA	0.49	NA	8	4.8	1400	0.59	NA	140	NA	2.8	NA	0.05	NA	0.5	1.1	410	NA	0.87	0.05	0.69	430	NA	17	110
MAR07-72	M-07-319	11.5	20	0.35	5.4	1	NA	280	7.3	0.07	7.2	0.37	34	230	190	12	NA	NA	1	NA	17	3	2800	5.1	NA	74	NA	10	NA	0.05	NA	2	4.2	250	NA	0.7	0.1	7.8	180	NA	110	230
MAR07-73	M-07-319	20	30	0.45	7.8	1	NA	670	4.9	0.05	2.6	0.25	8.7	39	42	6.1	NA	NA	3	NA	15	0.34	1500	4.7	NA	6.5	NA	20	NA	0.2	NA	2	3.2	280	NA	0.3	0.3	12	32	NA	60	160
MAR07-74	M-07-319	76	84	0.07	2.6	1	NA	150	0.4	0.02	2.8	0.09	160	210	79	23	NA	NA	0.24	NA	13	9.9	3300	1	NA	300	NA	1.3	NA	0.1	NA	0.5	1	190	NA	0.69	0.05	0.42	650	NA	8.8	220
MAR07-75	M-06-160	28	37	0.7	7	1	NA	870	6	0.36	3.5	0.24	5.4	96	15	3.7	NA	NA	2.8	NA	6	0.55	1300	3.7	NA	4.5	NA	12	NA	0.05	NA	2	1.2	360	NA	0.17	0.3	15	19	NA	67	61
MAR07-76	M-06-160	41	50	0.05	7.2	1	NA	2800	0.5	0.01	6.6	0.12	52	54	82	14	NA	NA	0.84	NA	2.5	2.5	1900	1.5	NA	7.2	NA	2.3	NA	0.05	NA	2	0.6	1300	NA	0.99	0.05	0.67	160	NA	23	150
MAR07-77	M-06-160	53	63	0.48	8	1	NA	2800	0.9	0.03	6.5	0.0015	38	52	43	10	NA	NA	1.2	NA	7	2	1700	1.4	NA	3.6	NA	3.5	NA	0.2	NA	0.5	0.7	1120	NA	1.2	0.05	1.2	72	NA	25	120
MAR07-78	M-06-153	5	15	0.2	6.8	1	NA	380	2	0.02	5.5	3.6	58	62	70	7.8	NA	NA	1.2	NA	9	4	1300	4.1	NA	100	NA	7.9	NA	0.05	NA	0.5	2.4	470	NA	0.33	0.05	3.3	190	NA	21	95
MAR07-79	M-06-153	31	40	0.84	4.4	1	NA	220	0.3	0.21	4.6	0.64	57	95	1400	6.7	NA	NA	0.3	NA	2.5	3.7	1100	0.52	NA	190	NA	1.9	NA	0.05	NA	1	0.5	340	NA	0.24	0.05	0.32	160	NA	7.7	78
MAR07-80	M-06-153	53	62	1.5	7.4	1	NA	300	0.3	0.23	6.7	0.65	61	100	3100	7.4	NA	NA	0.38	NA	2.5	3.4	1100	0.63	NA	200	NA	5.5	NA	0.05	NA	2	0.6	630	NA	0.33	0.05	0.33	300	NA	7.9	120
MAR07-81	M-06-155	14	22	4.4	7.7	1	NA	280	0.4	0.17	8	0.65	65	110	2900	7.1	NA	NA	0.4	NA	2.5	4.7	1100	0.38	NA	310	NA	3.5	NA	0.05	NA	2	0.4	550	NA	0.22	0.05	0.36	170	NA	9.9	76
MAR07-82	M-06-160	76	84	0.14	5.2	1	NA	1100	0.6	0.04	5.2	0.52	80	75	230	15	NA	NA	0.74	NA	2.5	4.6	2600	0.98	NA	100	NA	3.3	NA	0.												

**Summary of ABA and Bulk Metal Content Results for Process
Solids Samples**

Table #. Summary of ABA Results for Process Solids

Sample ID	Units	Composite Bulk Process Solids	Composite High-Sulphur Process Solids	Low-Sulphur 2475-01	Low-Sulphur 2475-02	Low-Sulphur 2475-03	Low-Sulphur 2475-04
Paste pH	---	8.8	7.64	8.52	8.83	8.88	8.74
NP	kg CaCO ₃ /t	37	45.4	21.1	20.1	21.0	21.1
AP	kg CaCO ₃ /t	15.9	191	3.75	2.19	1.88	2.19
Net NP	kg CaCO ₃ /t	21	-145.43	17.4	17.9	19.1	18.9
NP/AP	---	2.32	0.24	5.63	9.18	11.2	9.63
Total Sulphur	%	0.51	6.68	0.211	0.127	0.116	0.116
Sulphide-S	%	0.5	6.11	0.12	0.07	0.06	0.07
Acid Leachable SO ₄ -S	%	0.01	0.57	0.09	0.06	0.05	0.05
Total Carbon	%	0.13	0.386	0.121	0.123	0.121	0.112
Inorganic Carbon (CO ₂)	%	0.5	0.759	0.387	0.402	0.401	0.396

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Summary of Bulk Metal Content for Process Solids Samples

Sample ID	Units	Composite Bulk Process Solids	Composite High-Sulphur Process Solids	Low-Sulphur 2475-01	Low-Sulphur 2475-02	Low-Sulphur 2475-03	Low-Sulphur 2475-04
Silver (Ag)		0.2	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed
Aluminum (Al)	mg/kg	30300	26000	6100	6000	5600	5700
Arsenic (As)	mg/kg	666	4.8	<0.5	<0.5	<0.5	<0.5
Boron (B)	mg/kg	<10	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed
Barium (Ba)	mg/kg	100	79	25	25	24	25
Beryllium (Be)	mg/kg	<0.5	0.27	0.11	0.10	0.14	0.10
Bismuth (Bi)	mg/kg	<2	0.27	<0.09	<0.09	<0.09	<0.09
Calcium (Ca)	mg/kg	23700	14000	7300	7800	7100	7100
Cadmium (Cd)	mg/kg	<0.5	1.2	0.06	0.04	0.03	0.04
Cobalt (Co)	mg/kg	92	100	26	23	22	23
Chromium (Cr)	mg/kg	364	700	310	290	270	290
Copper (Cu)	mg/kg	161	1800	110	89	99	83
Iron (Fe)	mg/kg	63500	160000	48000	46000	45000	46000
Gallium (Ga)	mg/kg	10	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed
Mercury (Hg)	mg/kg	0.01	<0.1	<0.1	<0.1	<0.1	<0.1
Potassium (K)	mg/kg	1200	1500	600	620	590	620
Lanthanum (La)	mg/kg	20	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed
Lithium (Li)	mg/kg	Not Analyzed	11	5	5	4	5
Magnesium (Mg)	mg/kg	15400	24000	13000	13000	12000	12000
Manganese (Mn)	mg/kg	582	770	450	450	440	440
Molybdenum (Mo)	mg/kg	7	33	6.5	5.8	5.3	5.8
Sodium (Na)	mg/kg	5400	2600	350	340	300	300
Nickel (Ni)	mg/kg	375	890	200	180	170	180
Phosphorous (P)	mg/kg	1330	1100	1300	1400	1300	1300
Lead (Pb)	mg/kg	5	11	2.1	1.7	1.7	1.6
Antimony (Sb)	mg/kg	<2	<0.8	<0.8	<0.8	<0.8	<0.8
Scandium (Sc)	mg/kg	3	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed
Selenium (Se)	mg/kg	Not Analyzed	9.1	0.9	1.1	1.0	<0.7
Silicon (Si)	mg/kg	Not Analyzed	9500	3500	3400	3500	3500
Tin (Sn)	mg/kg	Not Analyzed	2.6	0.6	0.5	<0.5	<0.5
Strontium (Sr)	mg/kg	236	130	36	35	34	33
Thorium (Th)	mg/kg	<20	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed
Titanium (Ti)	mg/kg	1700	920	650	650	620	620
Thallium (Tl)	mg/kg	<10	0.08	<0.02	<0.02	<0.02	<0.02
Uranium (U)	mg/kg	<10	0.79	0.39	0.33	0.34	0.31
Vanadium (V)	mg/kg	234	160	170	170	170	170
Tungsten (W)	mg/kg	<10	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed
Yttrium (Y)	mg/kg	Not Analyzed	5.8	5.4	5.3	5.1	5.2
Zinc (Zn)	mg/kg	46	200	31	28	28	29

APPENDIX 2

G&T Metallurgical Report for Sulphur Recovery (2009)

MARATHON TAILINGS SULPHUR RECOVERY

MICON INTERNATIONAL LTD.

KM2475

DRAFT

October 1, 2009

G&T METALLURGICAL SERVICES LTD.

2957 Bowers Place, Kamloops, B.C. Canada V1S 1W5

E-mail: info@gtmet.com , Website: www.gtmet.com

ISO 9001:2000
Certificate No. FS 63170



October 1, 2009

Mr. Richard Gowans, P.Eng.
President
Micon International Ltd.
390 Bay St. Suite 900,
Toronto, Ontario
M5H 2Y2

Dear Mr. Gowans;

Re: Marathon Tailings Sulphur Recovery – KM2475

We have completed a program of metallurgical studies on a sample of tailings from the Marathon Project, as per our proposal of July 23, 2009. The sample was received at G&T Metallurgical Services Ltd. on August 3 and testing proceeded over the months of August and September. The objective of the program was to investigate the potential to recover sulphide minerals from the tailings and review sulphur mineral occurrence in the feed and test products. The results of this program are discussed in the following technical brief, detailed data can be found in the appendices.

The feed sample contained approximately 0.7 percent sulphur, mostly in the form of pyrrhotite. Minor amounts of pyrite, chalcopyrite, pentlandite and sphalerite were also present.

A simple flotation flowsheet was employed which recovered 76 percent of the sulphur into a rougher concentrate containing approximately 6 percent of the feed mass. The concentrate also contained minor amounts of precious metals.

Assays by size were conducted to review sulphur distribution in the feed and test products. QEMSCAN analyses were also performed on selected size fractions to review mineral composition and the mode of occurrence of the sulphide minerals. Most of the sulphide minerals were present in the very fine size fractions. Liberated pyrrhotite was generally well recovered through flotation, the remaining sulphide minerals in the tails occurred as grains locked with gangue and very fine liberated grains.

The flotation performance of the Marathon Tailings sample corresponds well to the liberation characteristics of the mineral suite. It is not likely that significant amounts of additional sulphide minerals can be recovered from this stream, leaving the threshold sulphur level at approximately 0.15 percent.

Thank you for using G & T Metallurgical Services Ltd. for your testing needs. If you have any questions regarding this report, please call me at 250-828-6157.

Sincerely,

DRAFT

Peter Mehrfert, P.Eng.
Senior Metallurgist

John Folinsbee, P.Eng.
Vice President-Operations

KM2475
October 1, 2009

Report Distribution:
Richard Gowans, Micon International Ltd., Toronto ON – 2 Copies
G&T Metallurgical Services Ltd., Kamloops, BC, Canada – 1 Copy

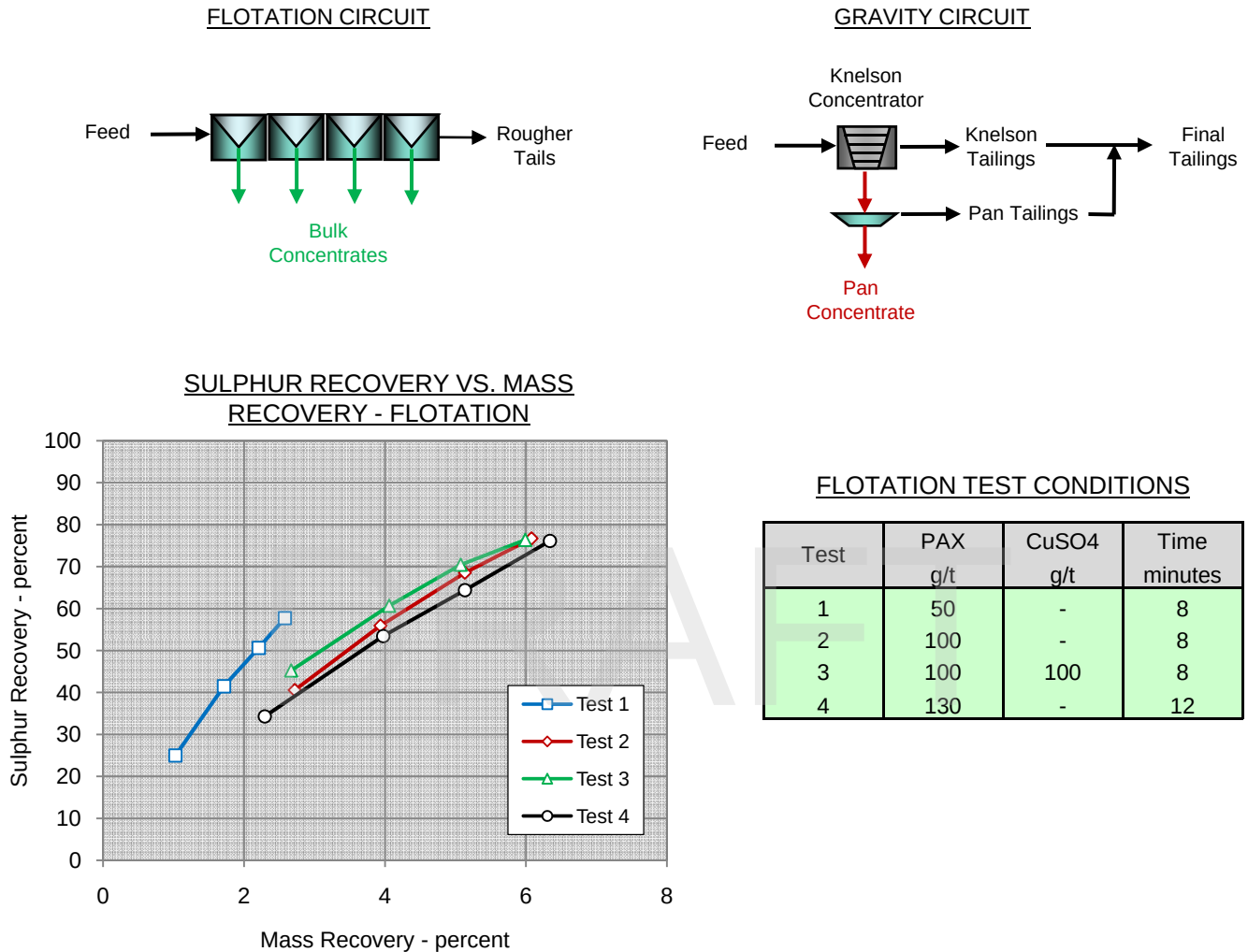
1.0 Metallurgical Testing

A series of rougher flotation tests and a single gravity concentration test were conducted on the Marathon tailings sample as received. Size analysis indicated the feed sample had a sizing of approximately 100µm K₈₀. A simple rougher flotation flowsheet was employed, PAX (potassium amyl xanthate) was used as the sulphide mineral collector. Results are summarized* in Figure 1 and the following comments may be of interest.

- The rougher concentrate captured approximately 76 percent of sulphur in the feed, at a rougher concentrate feed mass recovery of 6 percent. A collector dosage of 100 g/t was used to achieve this performance.
- Increasing the collector dosage, increasing the flotation time, and adding copper sulphate as an activator were investigated. None of these condition changes appeared to increase sulphur recovery.
- Additional assays were conducted on products from Test 2, which indicated that about 30 to 40 percent of the remaining precious metals were recovered into the bulk concentrate.
- A dark, iron rich concentrate was produced in the gravity concentration test, but did not appear to preferentially recover the sulphide minerals. Gold was somewhat concentrated in this test, 36 percent of the gold in the feed was recovered into a concentrate containing 1.7 g/t gold.

* Complete test data can be found in Appendix II.

FIGURE 1
FLWSHEETS AND PERFORMANCE DATA



METALLURGICAL PERFORMANCE

Stream	Wt %	Assay - % or g/t, Recovery - %							
		S	Fe	Cu	Ni	Au	Ag	Pt	Pd
Test 2 - Flotation									
Feed	100	0.59	6.19	0.02	0.02	0.02	0.89	0.07	0.15
Bulk Rougher Tail	93.9	0.15	5.41	0.01	0.02	0.01	0.7	0.05	0.09
Comb. Rougher Con	6.08	7.39	18.3	0.15	0.14	0.17	3.8	0.40	1.06
Recovery		76.6	18.0	49.3	34.1	42.8	26.0	35.1	43.2
Test 5 - Gravity									
Feed	100	0.68	6.77	0.02	0.04	0.03	1.11	0.05	0.14
Gravity Tails	99.3	0.67	6.60	0.02	0.04	0.02	1.10	0.05	0.14
Pan Concentrate	0.66	1.54	32.3	0.02	0.08	1.68	2.20	0.05	0.12
Recovery		1.5	3.1	0.6	1.2	35.7	1.3	0.7	0.5

2.0 Assay by Size and Mineralogy

Following metallurgical testing, sulphur and iron assays by size were conducted on the rougher tails and combined concentrate from Test 2, as well as on a sample of the feed. Results are summarized in Figure 2, detailed sizing and assay data can be found in Appendices III and IV.

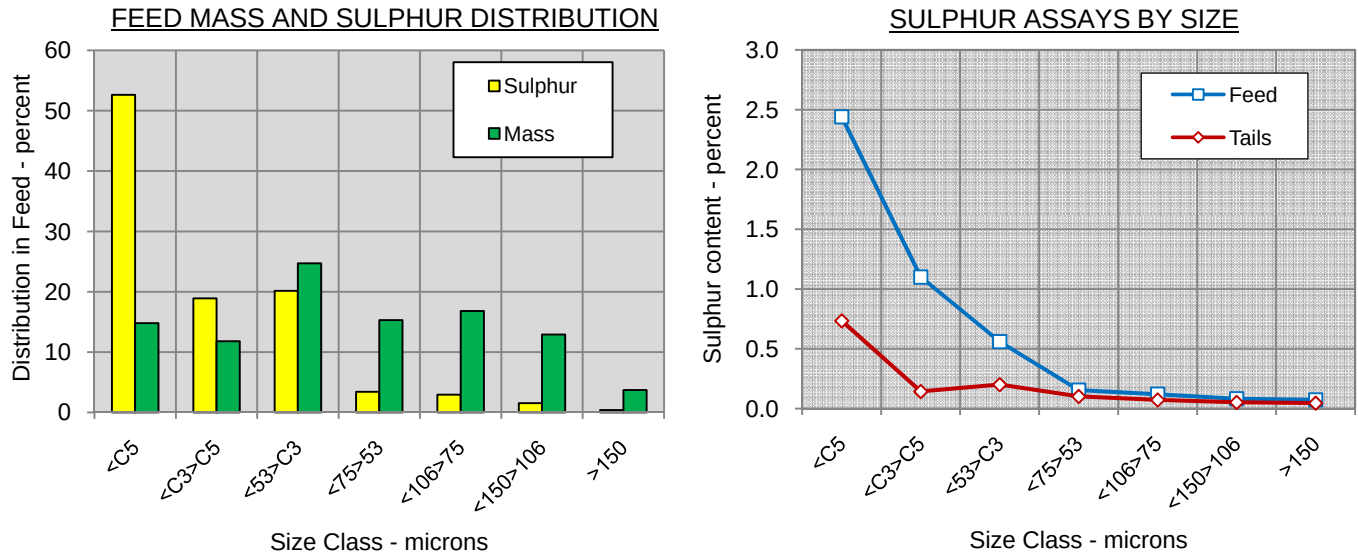
The majority of the sulphur bearing minerals were present in the fine size fractions. Approximately 70 percent of the sulphur in the feed was present in the <C3 fractions, which had an effective cut size of 20 microns.

Particle mineral analyses using QEMSCAN technology were conducted on sized fractions of the feed sample and the rougher tailings from Test 2. A summary of mineral liberation data is presented in Figure 2, detailed data can be found in Appendix V. The following points may be of interest:

- Pyrrhotite was the predominant sulphide mineral in the feed, accounting for approximately 88 percent of the feed sulphur*.
- The mineral liberation analysis suggests that pyrrhotite in the feed was relatively well liberated, measured at 72 percent liberated in two dimensions. This was the mineral group that was predominantly recovered through rougher flotation.
- Pyrrhotite remaining in the rougher tails accounted for approximately 65 percent of the sulphur in the rougher tails, of which only 46 percent was liberated.
- Approximately 8 percent of the sulphur in the feed was contained in copper sulphides and pyrite. These minerals were poorly liberated, and consequently were not well recovered through flotation.

* See Tables V-1E and V-2E in Appendix V for details on sulphur distribution across the mineral suite.

FIGURE 2
SULPHUR DISTRIBUTION AND MINERAL DATA

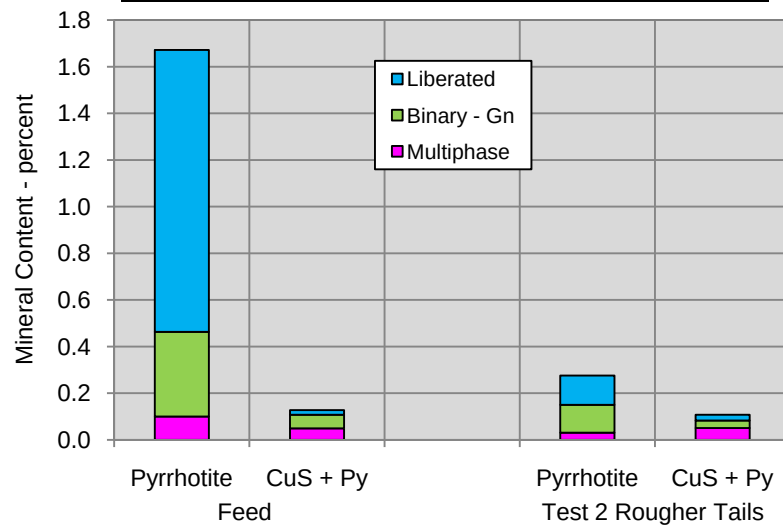


MINERAL LIBERATION DATA

Mineral Status	Mineral Liberation-2 Dimensions			
	Feed		Test 2 Ro Tails	
	Po	Cs + Py	Po	Cs + Py
Liberated	72.3	15.3	45.6	23.0
Binary - Gn	21.7	45.8	43.3	30.2
Multiphase	6.0	39.0	11.1	46.8

Note: 1. Po = Pyrrhotite, Cs = Copper sulphides, Py = Pyrite
2. Complete data can be found in Appendix V.

SULPHIDE MINERALS BY CLASS OF ASSOCIATION



3.0 Conclusions and Recommendations

A sample of tailings from the Marathon Project was tested in a series of bench scale flotation tests, which recovered approximately 76 percent of the remaining sulphur. Recovery of sulphide minerals to the bulk concentrate corresponded to a reduction of the sulphur content in the feed from 0.7 percent to 0.15 percent in the rougher tailings. It will be difficult to reduce the sulphur level much lower than this value for the following reasons:

- A significant portion of the sulphur bearing minerals are present in the quite fine <20 micron size fraction. These fine particles are generally more difficult to recover through flotation, as demonstrated by their presence in the feed sample.
- Less than 40 percent of the remaining sulphide minerals in the rougher tails are liberated. Most are locked with gangue in binaries or multiphase grains.

The rougher concentrate produced contained 6 percent of the feed mass and approximately 40 percent of the remaining precious metals. Although somewhat concentrated, the precious metal grades are still quite low in the bulk concentrate and may not have any economic value.

A gravity concentration test was conducted on a 10 kg sample of the feed. Very little sulphide mineral was recovered, although approximately 36 percent of the gold in the feed was recovered to the gravity concentrate. Again, due to the low gold content in the concentrate, it may not have any economic benefit.

Employing flotation to recover the remaining pyrrhotite in the Marathon Tailings appears to be a suitable method to reduce sulphur content in the tailings stream.

APPENDIX I – KM2475

SAMPLE ORIGIN

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1.0 Sample Origin

On August 13, 2009, a shipment containing 56.2 kilograms of tailings was received at G & T Metallurgical Services Ltd. The sample was selected from tailings produced in a pilot plant campaign by others, on ore from the Marathon PGM deposit. The mass and identification of the samples received are displayed in Table I-1.

TABLE I-1
SAMPLES RECEIVED

Sample ID	Weight (kg)
Marathon Tailings Bucket 1 of 2	26.2
Marathon Tailings Bucket 2 of 2	30
Total	56.2

Upon receipt, the samples were homogenized, split into 2 kilogram charges and stored under nitrogen at -10°C until consumed. Presented in Table I-2, representative heads were removed and analyzed for iron and sulphur.

TABLE I-2
CHEMICAL COMPOSITION OF THE HEAD ASSAYS

Sample	Assays – percent or g/tonne	
	Fe	S
Marathon Tailings Head 1	6.50	0.59
Marathon Tailings Head 2	6.40	0.62
Average	6.45	0.60

APPENDIX II - KM2475

METALLURGICAL TEST DATA

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INDEX

<u>TEST</u>		<u>PAGE</u>
1	Rougher Test - Marathon Tailings Composite	1
2	Rougher Test - Marathon Tailings Composite	3
3	Rougher Test - Marathon Tailings Composite	5
4	Rougher Test - Marathon Tailings Composite	7
5	Gravity Test - Marathon Tailings Composite	9

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PROJECT NO: KM2475-01

PURPOSE: Preliminary Rougher Rate Test.

PROCEDURE: Perform a one product rougher test.

FEED: 2 kg of Marathon Tailings Composite

FLWSHEET: 1

Stage	Reagents Added g/tonne			Time (minutes)			pH
	PAX		MIBC	Grind	Cond.	Float	
<u>BULK CIRCUIT:</u>							
Rougher 1	20		8		1	2	8.3
Rougher 2	10		8		1	2	8.4
Rougher 3	10		0		1	2	8.4
Rougher 4	10		8		1	2	8.4

Flotation Data	Rougher
Flotation Machine	D2D
Cell Size in liters	4.4
Aspiration	Air
Impeller Speed in rpm	1100

KM2475-01 Marathon Tailings

Overall Metallurgical Balance

Product	Weight		Assay - percent or g/t		Distribution - percent	
	grams	%	Fe	S	Fe	S
Bulk Rougher 1	20.0	1.0	28.9	14.3	4.4	25.0
Bulk Rougher 2	13.4	0.7	28.8	14.1	3.0	16.5
Bulk Rougher 3	9.6	0.5	28.0	10.9	2.1	9.1
Bulk Rougher 4	7.2	0.4	28.4	11.3	1.6	7.1
Bulk Rougher Tails	1897.6	97.4	6.1	0.26	89.0	42.3
Feed	1947.8	100	6.7	0.59	100	100

KM2475-01 Marathon Tailings

Cumulative Metallurgical Balance

Cumulative Product	Cum. Weight		Assay - percent or g/t		Distribution - percent	
	grams	%	Fe	S	Fe	S
Product 1	20.0	1.0	28.9	14.3	4.4	25.0
Product 1 to 2	33.4	1.7	28.9	14.2	7.4	41.5
Product 1 to 3	43.0	2.2	28.7	13.5	9.5	50.6
Product 1 to 4	50.2	2.6	28.6	13.2	11.0	57.7
Product 5	1897.6	97.4	6.1	0.26	89.0	42.3
Feed	1947.8	100	6.7	0.59	100	100

PROJECT NO: KM2475-02

PURPOSE: To Repeat Test 1 With More Collector.

PROCEDURE: Perform a one product rougher test.

FEED: 2 kg of Marathon Tailings Composite

FLWSHEET: 1

Stage	Reagents Added g/tonne			Time (minutes)			pH
	PAX		MIBC	Grind	Cond.	Float	
<u>BULK CIRCUIT:</u>							
Rougher 1	30		15		1	2	7.5
Rougher 2	30		8		1	2	7.6
Rougher 3	20		8		1	2	7.7
Rougher 4	20		0		1	2	7.7

Flotation Data	Rougher
Flotation Machine	D2D
Cell Size in liters	4.4
Aspiration	Air
Impeller Speed in rpm	1100

KM2475-02 Marathon Tailings

Overall Metallurgical Balance

Product	Weight		Assay - percent or g/t		Distribution - percent	
	grams	%	Fe	S	Fe	S
Bulk Rougher 1	54.1	2.7	20.6	8.79	9.0	40.6
Bulk Rougher 2	24.2	1.2	19.9	7.43	3.9	15.3
Bulk Rougher 3	23.8	1.2	16.5	6.22	3.2	12.6
Bulk Rougher 4	18.8	0.9	16.5	5.08	2.5	8.2
Bulk Rougher Tails	1868.3	93.9	5.4	0.15	81.5	23.3
Feed	1989.2	100	6.2	0.59	100	100

KM2475-02 Marathon Tailings

Cumulative Metallurgical Balance

Cumulative Product	Cum. Weight		Assay - percent or g/t		Distribution - percent	
	grams	%	Fe	S	Fe	S
Product 1	54.1	2.7	20.6	8.79	9.0	40.6
Product 1 to 2	78.3	3.9	20.4	8.37	12.9	55.9
Product 1 to 3	102.1	5.1	19.5	7.87	16.0	68.6
Product 1 to 4	120.9	6.1	19.0	7.43	18.5	76.7
Product 5	1868.3	93.9	5.4	0.15	81.5	23.3
Feed	1989.2	100	6.2	0.59	100	100

PROJECT NO: KM2475-03

PURPOSE: Investigate a Copper Sulphate Addition.

PROCEDURE: Perform a one product rougher test.

FEED: 2 kg of Marathon Tailings Composite

FLWSHEET: 1

Stage	Reagents Added g/tonne			Time (minutes)			pH
	CuSO4	PAX	MIBC	Grind	Cond.	Float	
<u>BULK CIRCUIT:</u>							
Rougher 1	100	30	15		1	2	7.7
Rougher 2		30	8		1	2	8.0
Rougher 3		20	8		1	2	7.9
Rougher 4		20	0		1	2	7.9

Flotation Data	Rougher
Flotation Machine	D2E
Cell Size in liters	4.4
Aspiration	Air
Impeller Speed in rpm	1100

KM2475-03 Marathon Tailings

Overall Metallurgical Balance

Product	Weight		Assay - percent or g/t		Distribution - percent	
	grams	%	Fe	S	Fe	S
Bulk Rougher 1	53.9	2.7	25.0	10.4	10.6	45.2
Bulk Rougher 2	28.1	1.4	21.5	6.81	4.8	15.4
Bulk Rougher 3	20.5	1.0	18.5	5.92	3.0	9.8
Bulk Rougher 4	18.5	0.9	15.9	3.96	2.3	5.9
Bulk Rougher Tails	1899.4	94.0	5.3	0.15	79.3	23.6
Feed	2020.4	100	6.3	0.61	100	100

KM2475-03 Marathon Tailings

Cumulative Metallurgical Balance

Cumulative Product	Cum. Weight		Assay - percent or g/t		Distribution - percent	
	grams	%	Fe	S	Fe	S
Product 1	53.9	2.7	25.0	10.4	10.6	45.2
Product 1 to 2	82.0	4.1	23.8	9.17	15.4	60.7
Product 1 to 3	102.5	5.1	22.7	8.52	18.4	70.5
Product 1 to 4	121.0	6.0	21.7	7.82	20.7	76.4
Product 5	1899.4	94.0	5.3	0.15	79.3	23.6
Feed	2020.4	100	6.3	0.61	100	100

PROJECT NO: KM2475-04

PURPOSE: To Repeat Test 2 with More Collector and Flotation.

PROCEDURE: Perform a one product rougher test.

FEED: 2 kg of Marathon Tailings Composite

FLWSHEET: 1

Stage	Reagents Added g/tonne			Time (minutes)			pH
	PAX		MIBC	Grind	Cond.	Float	
<u>BULK CIRCUIT:</u>							
Rougher 1	50		15		1	2	8.1
Rougher 2	40		8		1	2	8.1
Rougher 3	20		8		1	4	8.1
Rougher 4	20		0		1	4	8.1

Flotation Data	Rougher
Flotation Machine	D2D
Cell Size in liters	4.4
Aspiration	Air
Impeller Speed in rpm	1100

KM2475-04 Marathon TailingsOverall Metallurgical Balance

Product	Weight		Assay - percent or g/t		Distribution - percent	
	grams	%	Fe	S	Fe	S
Bulk Rougher 1	44.9	2.3	22.7	9.27	7.4	34.3
Bulk Rougher 2	32.9	1.7	20.4	7.06	4.9	19.1
Bulk Rougher 3	22.7	1.2	18.9	5.85	3.1	10.9
Bulk Rougher 4	23.6	1.2	19.0	6.02	3.3	11.7
Bulk Rougher Tails	1833.5	93.7	6.1	0.16	81.3	23.9
Feed	1957.6	100	7.0	0.62	100	100

KM2475-04 Marathon TailingsCumulative Metallurgical Balance

Cumulative Product	Cum. Weight		Assay - percent or g/t		Distribution - percent	
	grams	%	Fe	S	Fe	S
Product 1	44.9	2.3	22.7	9.27	7.4	34.3
Product 1 to 2	77.8	4.0	21.7	8.34	12.3	53.5
Product 1 to 3	100.5	5.1	21.1	7.77	15.4	64.4
Product 1 to 4	124.1	6.3	20.7	7.44	18.7	76.1
Product 5	1833.5	93.7	6.1	0.16	81.3	23.9
Feed	1957.6	100	7.0	0.62	100	100

PROJECT NO: KM2475-05

PURPOSE: Preliminary Gravity Separation.

PROCEDURE: Standard Knelson Concentrator/Panning Procedure.

FEED: 10 kg Marathon Tailings Composite.

FLWSHEET NO: 4

Stage	Inlet Pressure	Outlet Pressures		Time Minutes
		Start	Finish	
Grind				N/A
KN Separation 1	64	2	2	23

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KM2475-05 Marathon TailingsOverall Metallurgical Balance

Product	Weight		Assay - percent				Distribution - percent			
	grams	%	Cu	Ni	Fe	S	Cu	Ni	Fe	S
Pan Con	64.5	0.7	0.02	0.08	32.3	1.54	0.6	1.2	3.1	1.5
Knelson Tail	9752.1	99.3	0.02	0.04	6.60	0.67	99.4	98.8	96.9	98.5
Feed	9816.6	100	0.02	0.04	6.77	0.68	100	100	100	100

KM2475-05 Marathon TailingsOverall Metallurgical Balance

Cumulative Product	Cum. Weight		Assay - g/t				Distribution - percent			
	grams	%	Ag	Au	Pt	Pd	Ag	Au	Pt	Pd
Pan Con	64.5	0.7	2.2	1.68	0.05	0.12	1.3	35.7	0.7	0.5
Knelson Tail	9752.1	99.3	1.1	0.02	0.05	0.14	98.7	64.3	99.3	99.5
Feed	9816.6	100	1.1	0.03	0.05	0.14	100	100	100	100

APPENDIX III - KM2475

PARTICLE SIZING DATA

INDEX

<u>TABLE</u>		<u>μm K₈₀</u>	<u>PAGE</u>
III-1	KM2475-Marathon Tailings Head	99	1
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III-3	KM2475-02 Rougher Tail	100	3

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TABLE III-1
CYCLOSIZING ANALYSIS
KM2475 Marathon Tailings - Head

Product	Size (μm)		Weight % Retained	Cumulative % Passing
	Limiting	Effective		
48 Mesh	300	300	0.00	100.0
65 Mesh	212	212	0.10	99.9
100 Mesh	150	150	3.60	96.3
150 Mesh	106	106	12.90	83.4
200 Mesh	75	75	16.80	66.6
270 Mesh	53	53	15.30	51.3
Cyclone 1	45	42	5.20	46.1
Cyclone 2	31	29	8.90	37.2
Cyclone 3	22	20	10.60	26.6
Cyclone 4	15	14	8.20	18.4
Cyclone 5	12	11	3.60	14.8
Total			100.00	**

Operating Conditions	Measured	Factor
Temperature ($^{\circ}\text{C}$)	15.70	1.051
Specific Gravity	2.99	0.917
Flow Rate (mm)	180	1.012
Elutriation Time (min)	20	0.955
Overall Factor		0.931
K80 Size (microns)		99

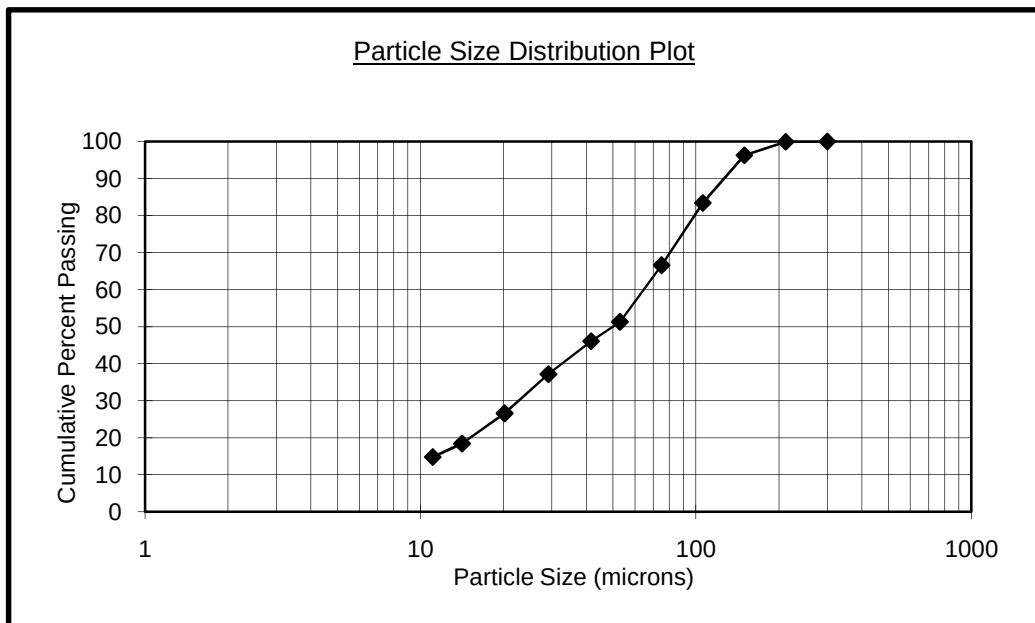


TABLE III-2
CYCLOSIZING ANALYSIS
KM2475-02 Rougher Concentrate

Product	Size (μm)		Weight % Retained	Cumulative % Passing
	Limiting	Effective		
48 Mesh	300	300	0.00	100.0
65 Mesh	212	212	0.29	99.7
100 Mesh	150	150	3.48	96.2
150 Mesh	106	106	4.93	91.3
200 Mesh	75	75	5.07	86.2
270 Mesh	53	53	5.94	80.3
Cyclone 1	45	39	1.30	79.0
Cyclone 2	31	27	3.77	75.2
Cyclone 3	22	19	9.42	65.8
Cyclone 4	15	13	9.71	56.1
Cyclone 5	12	10	3.62	52.5
Total			100.00	**

Operating Conditions	Measured	Factor
Temperature ($^{\circ}\text{C}$)	15.70	1.051
Specific Gravity	3.26	0.858
Flow Rate (mm)	180	1.012
Elutriation Time (min)	20	0.955
Overall Factor		0.872
K80 Size (microns)		50

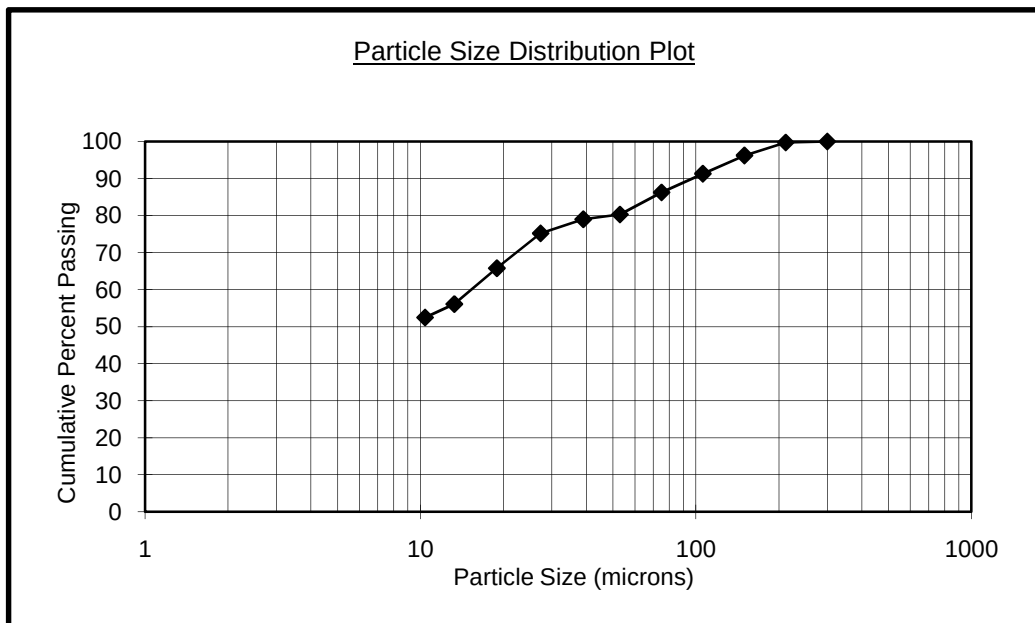
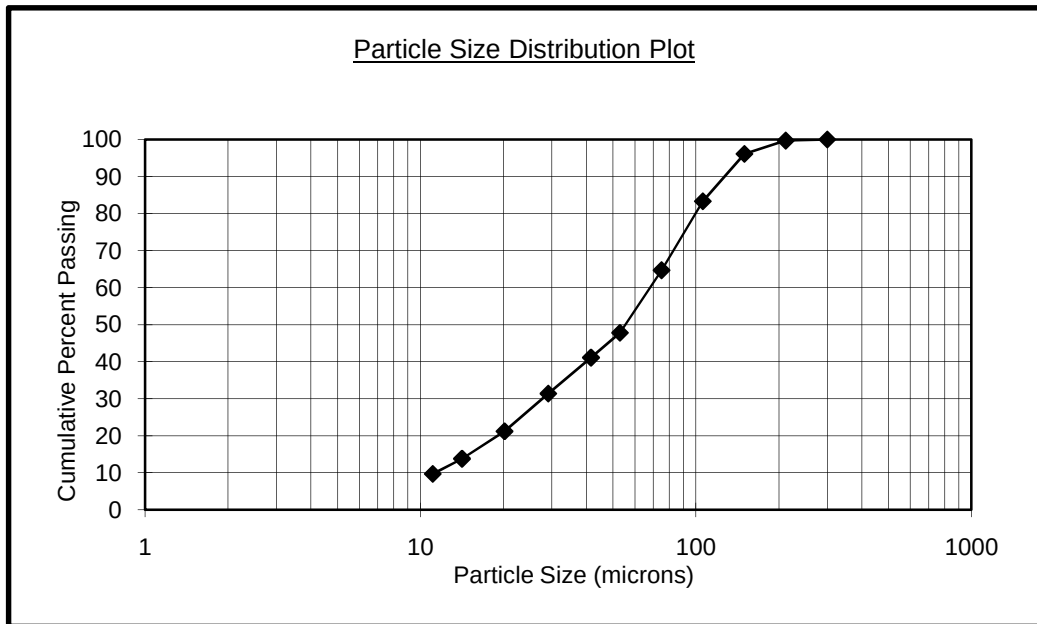


TABLE III-3
CYCLOSIZING ANALYSIS
KM2475-02 Rougher Tail

Product	Size (μm)		Weight % Retained	Cumulative % Passing
	Limiting	Effective		
48 Mesh	300	300	0.00	100.0
65 Mesh	212	212	0.30	99.7
100 Mesh	150	150	3.60	96.1
150 Mesh	106	106	12.80	83.3
200 Mesh	75	75	18.60	64.7
270 Mesh	53	53	16.90	47.8
Cyclone 1	45	42	6.70	41.1
Cyclone 2	31	29	9.70	31.4
Cyclone 3	22	20	10.20	21.2
Cyclone 4	15	14	7.40	13.8
Cyclone 5	12	11	4.10	9.7
Total			100.00	**

Operating Conditions	Measured	Factor
Temperature ($^{\circ}\text{C}$)	15.70	1.051
Specific Gravity	3.00	0.915
Flow Rate (mm)	180	1.012
Elutriation Time (min)	20	0.955
Overall Factor		0.930
K80 Size (microns)		100



APPENDIX IV – KM2475

SPECIAL ASSAYS AND
STATISTICAL INFORMATION

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<u>TABLE</u>		<u>PAGE</u>
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2	Statistical Analysis of Head Assays	2
3	Marathon Tailings - Assays by Size	3
4	Additional Assays - Test 2 Products	4

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TABLE IV-1
REPLICATE COMPOSITE HEAD ASSAY DATA

Sample	Assay - percent or g/tonne	
	Fe	S(t)
Marathon Tailings Head 1	6.50	0.59
Marathon Tailings Head 2	6.40	0.62
Average	6.45	0.60

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TABLE IV-2
STATISTICAL ANALYSIS OF HEAD ASSAYS
Marathon Tailings

Test	Assays - percent or g/tonne	
	Fe	S(t)
1	6.68	0.59
2	6.24	0.59
3	6.27	0.61
4	7.03	0.62
5	6.77	0.68
Average Head	6.6	0.62
Measured Head	6.45	0.60

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TABLE IV-3
ASSAYS BY SIZE - Marathon Tailings
Feed

FRACTION	Wt%	Assays - %		Distribution - %	
		Fe	S	Fe	S
>150µm	3.7	2.57	0.07	1.54	0.39
<150>106µm	12.9	3.07	0.08	6.43	1.55
<106>75µm	16.8	4.26	0.12	11.6	2.94
<75µm>53µm	15.3	4.96	0.15	12.3	3.43
<53>C3	24.7	6.60	0.56	26.5	20.2
<C3>C5	11.8	7.30	1.10	14.0	18.9
<C5	14.8	11.5	2.44	27.6	52.6
Calculated Head	100	6.16	0.69	100.0	100.0

Test 2 - Rougher Tails

FRACTION	Wt%	Assays - %		Distribution - %	
		Fe	S	Fe	S
>150µm	3.9	2.58	0.05	1.92	0.99
<150>106µm	12.8	3.12	0.05	7.63	3.70
<106>75µm	18.6	4.08	0.07	14.5	7.52
<75µm>53µm	16.9	4.94	0.10	16.0	9.56
<53>C3	26.6	6.30	0.20	32.0	29.6
<C3>C5	11.5	5.47	0.14	12.0	9.12
<C5	9.7	8.60	0.73	15.9	39.5
Calculated Head	100	5.2	0.18	100.0	100.0

Test 2 - Combined Rougher Concentrate

FRACTION	Wt%	Assays - %		Distribution - %	
		Fe	S	Fe	S
>150µm	3.77	10.6	3.37	2.08	1.75
<150>106µm	4.93	11.0	3.59	2.83	2.44
<106>75µm	5.07	12.7	4.48	3.36	3.13
<75µm>53µm	5.94	12.8	4.73	3.97	3.87
<53>C3	14.5	19.4	10.0	14.7	20.0
<C3>C5	13.3	25.2	10.8	17.5	19.8
<C5	52.5	20.3	6.79	55.6	49.0
Calculated Head	100	19.2	7.26	100.0	100.0

TABLE IV-4
ADDITIONAL ASSAYS - Test 2 Products

Stream	Assays - percent or g/tonne					
	Cu	Ni	Au	Ag	Pt	Pd
Bulk Rougher Tail	0.01	0.02	0.015	0.7	0.048	0.09
Combined Rougher Concentrate	0.15	0.14	0.171	3.8	0.402	1.06

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APPENDIX V – KM2475

MODAL ANALYSIS DATA

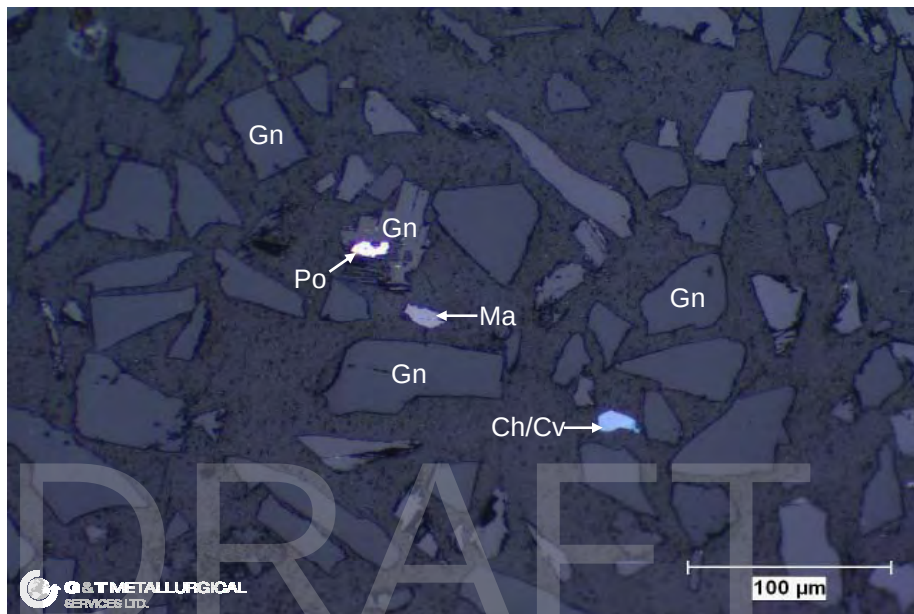
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<u>TABLE</u>		<u>PAGE</u>
V-1	KM2475-Marathon Tailing - 99µm K ₈₀	1
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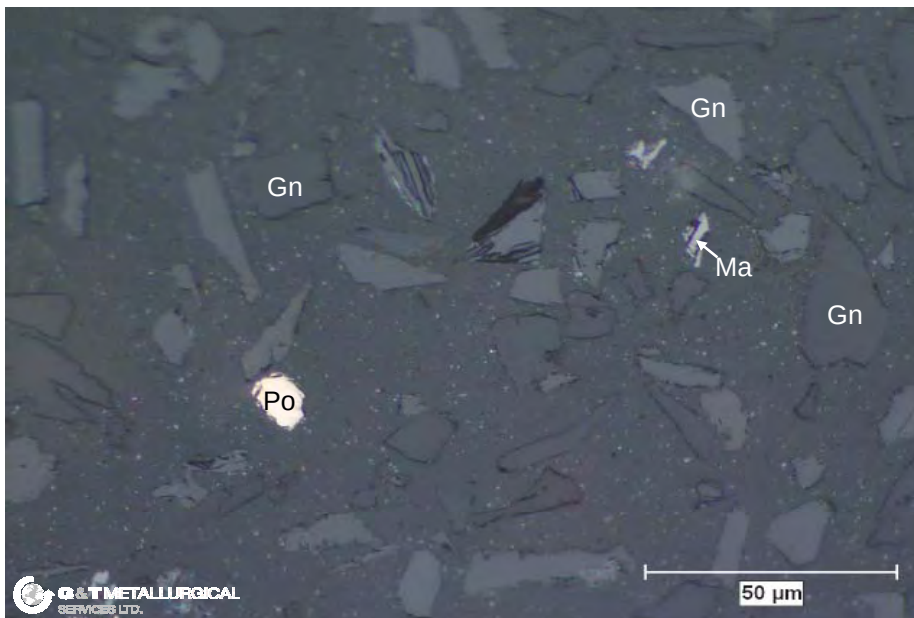
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PHOTOMICROGRAPH 1
MARATHON PROJECT – ROUGHER TAILING
TEST 02 KM2475

<53>20µm



<20>11µm



*Ch/Cv-Chalcocite/Covellite, Po-Pyrrhotite, Ma-Magnetite, Gn-Gangue

TABLE V-1A
SUMMARY OF PERCENT LIBERATION BY SIZE AND CLASS
Marathon Tailing, 99µm K80
KM2475

Size Range	>106µm					<106>53µm					<53µm>C3				
Mineral Status	Pe	Cs	Po	Py	Gn	Pe	Cs	Po	Py	Gn	Pe	Cs	Po	Py	Gn
Liberated	0.0	0.0	0.0	0.0	16.8	0.0	0.0	1.0	0.0	32.5	0.0	0.0	10.7	4.6	24.7
Binary - Pe		0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0
Binary - Cs	0.0		0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0		0.1	2.9	0.0
Binary - Po	0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.2		0.0	0.1
Binary - Py	0.0	0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0		0.0
Binary - Gn	0.0	3.5	0.3	0.3		0.0	9.5	2.0	3.1		0.0	16.4	5.1	5.2	
Multiphase	0.0	11.8	0.5	1.9	0.0	0.0	20.2	2.1	6.9	0.0	0.0	6.3	1.3	3.3	0.0
Total	0.0	15.3	0.9	2.2	16.9	0.0	29.7	5.1	9.9	32.6	0.0	23.0	17.2	16.0	24.8

Size Range	<C3>C5					<C5				
Mineral Status	Pe	Cs	Po	Py	Gn	Pe	Cs	Po	Py	Gn
Liberated	0.0	0.1	15.9	1.3	11.6	0.0	7.2	44.6	18.3	13.9
Binary - Pe		0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0
Binary - Cs	0.0		0.1	0.0	0.0	0.0		0.2	0.0	0.0
Binary - Po	0.0	0.4		0.2	0.1	0.0	4.6		3.1	0.1
Binary - Py	0.0	0.0	0.2		0.0	0.0	0.5	0.6		0.0
Binary - Gn	0.0	8.7	3.8	2.4		0.0	9.1	10.6	32.5	
Multiphase	0.0	0.3	0.2	0.9	0.0	0.0	1.1	0.6	13.0	0.0
Total	0.0	9.6	20.2	4.9	11.7	0.0	22.5	56.6	66.9	14.0

Mineral Status	Mineral Liberation-2 Dimensions					Mineral Liberation-3 Dimensions				
	Pe	Cs	Po	Py	Gn	Pe	Cs	Po	Py	Gn
Liberated	0.0	7.3	72.3	24.2	99.5	0.0	0.0	65.4	5.3	99.4
Binary - Pe		0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0
Binary - Cs	0.0		0.4	2.9	0.1	0.0		0.5	3.6	0.2
Binary - Po	0.0	5.2		3.3	0.2	0.0	5.6		4.1	0.3
Binary - Py	0.0	0.5	0.8		0.0	0.0	0.5	1.0		0.0
Binary - Gn	0.0	47.2	21.7	43.5		0.0	50.9	27.2	54.3	
Multiphase	0.0	39.8	4.9	26.1	0.1	0.0	42.9	6.1	32.6	0.1
Total	0.0	100	100	100	100	0.0	100	100	100	100

Notes 1) Pe-Pentlandite, Cs-Copper Sulphides including Chalcopyrite and Chalcocite/Covellite,
Po-Pyrrhotite, Py-Pyrite, Gn-Non-Sulphide Minerals.

2) 0.0 Indicates these minerals were not observed during the counting procedure.

3) The 106µm and 53µm sizing fraction corresponds to the Tyler 150 and 270 mesh sieves.
C1 to C5 indicates cyclones 1 to 5 on the cyclosizer.

4) The Total line is the distribution of mineral in the size fraction. Original data is from the size by
assay and distribution tables.

5) The calculated liberation of the unsized product as measured in two dimensions has been
converted to three dimensions using correction factors developed by G & T Metallurgical Services.

6) The three dimension liberation is zero if the liberation in two dimensions is less than 20 percent.

TABLE V-1B
SIZE BY ASSAY AND DISTRIBUTION BASED ON METAL CONTENT
Marathon Tailing, 99µm K80

Size Fraction	Mass %	Assays-percent					Distribution				
		Fe	S				Fe	S			
>106µm	16.6	2.96	0.08				8.0	1.9			
<106>53µm	32.1	4.59	0.14				23.9	6.4			
<53µm>C3	24.7	6.60	0.56				26.5	20.2			
<C3>C5	11.8	7.30	1.10				14.0	18.9			
<C5	14.8	11.50	2.44				27.6	52.6			
Total	100	6.16	0.69				100	100			

TABLE V-1C
SIZE BY ASSAY AND DISTRIBUTION BASED ON MINERAL CONTENT
Marathon Tailing, 99µm K80

Size Fraction	Mass %	Assays-percent					Distribution				
		Pe	Cs	Po	Py	Gn	Pe	Cs	Po	Py	Gn
>106µm	16.6	0.00	0.07	0.09	0.01	99.8	0.8	15.3	0.9	2.2	16.9
<106>53µm	32.1	0.00	0.07	0.27	0.02	99.6	3.6	29.7	5.1	9.9	32.6
<53µm>C3	24.7	0.01	0.07	1.16	0.03	98.7	18.5	23.0	17.2	16.0	24.8
<C3>C5	11.8	0.02	0.06	2.86	0.02	97.0	12.0	9.6	20.2	4.9	11.7
<C5	14.8	0.09	0.12	6.39	0.22	93.2	65.1	22.5	56.6	66.9	14.0
Total	100	0.02	0.08	1.67	0.05	98.2	100	100	100	100	100

Notes: 1) Pe-Pentlandite, Cs-Copper Sulphides including Chalcopyrite and Chalcocite/Covellite, Po-Pyrrhotite, Py-Pyrite, Gn-Non-Sulphide Minerals.

2) Mineral assays are based on gravimetric factors to convert the metal to the pure mineral.

3) See appendix I for details of gravimetric factors.

4) An assay value of "0" indicates the assay value is less than the detection limit.

TABLE V-1D
ESTIMATED RELATIVE PROPORTION AND COMPOSITION OF MINERAL GRAINS
Marathon Tailing, 99µm K80

Binary Component	Proportion by Weight-2D					Proportion by Weight-3D					Composition of Grains				
	Pe	Cs	Po	Py	Gn	Pe	Cs	Po	Py	Gn	Pe	Cs	Po	Py	Gn
Liberated	0.00	0.01	1.21	0.01	97.7	0.00	0.00	1.09	0.00	97.6	0	100	100	100	100
Binary - Pe		0.00	0.00	0.00	0.0		0.00	0.00	0.00	0.0		0	0	0	0
Binary - Cs	0.00		0.01	0.00	0.1	0.00		0.01	0.00	0.2	0		64	81	80
Binary - Po	0.00	0.00		0.00	0.2	0.00	0.00		0.00	0.3	0	36		11	39
Binary - Py	0.00	0.00	0.01		0.0	0.00	0.00	0.02		0.0	0	19	89		60
Binary - Gn	0.00	0.04	0.36	0.02		0.00	0.04	0.45	0.03		0	20	61	40	
Multiphase	0.00	0.03	0.08	0.01	0.1	0.00	0.03	0.10	0.02	0.1	0	16	47	7	30
Average Composition	0.00	0.08	1.67	0.05	98.2	0.00	0.08	1.67	0.05	98.2	0	18	80	16	99

Notes 1) The two-dimensional proportion of minerals is a weighted estimate which is based on the liberation and the mineral content of the unsized sample.

2) The three-dimensional data is based on converting the two dimensional liberation data using G & T Metallurgical Services correction factors.

3) Composition values of "0" represents values <2% and "100" represents values >98%.

TABLE V-1E
DISTRIBUTION BY SIZE RANGE OF IRON SULPHIDES MINERALS
Marathon Tailing, 99µm K80

Size Fraction	Mass %	% Sulphur Bearing Minerals						% Sulphur of Total Sulphur						% Iron of Total Iron				
		Pe	Cs	Sp	Po	Py	Ot	Pe	Cs	Sp	Po	Py	Ot	Cs	Po	Py	FeOx	Gn
>106µm	16.6	0.6	42.5	0.3	52.6	3.8	0.1	0.6	40.0	0.3	53.5	5.5	0.0	0.7	1.7	0.0	4.8	92.9
<106>53µm	32.1	0.6	20.2	0.0	74.8	4.2	0.2	0.5	18.6	0.0	74.8	6.0	0.1	0.4	3.4	0.0	4.4	91.7
<53µm>C3	24.7	1.1	5.4	4.2	86.4	2.4	0.5	1.0	5.0	3.7	86.5	3.4	0.5	0.3	9.7	0.2	13.2	76.7
<C3>C5	11.8	0.7	2.1	0.4	96.0	0.7	0.1	0.6	2.0	0.4	96.1	1.0	0.0	0.3	27.1	0.0	18.6	54.0
<C5	14.8	1.2	1.6	6.1	87.7	3.0	0.4	1.0	1.5	5.3	87.7	4.3	0.1	0.3	37.1	0.2	24.1	38.3
Total	100	1.03	4.11	4.27	87.7	2.57	0.32	0.91	4.11	3.64	87.5	3.62	0.17	0.4	12.5	0.1	11.2	75.8

Notes 1) Pe-Pentlandite, Cs-Copper Sulphides including Chalcopyrite and Chalcocite/Covellite, Sp-Sphalerite, Po-Pyrrhotite, Py-Pyrite, Ot-Other Sulphides including trace amount of Molybdenite, Jarosite and Calcium Sulphate.

2) Cs-Chalcopyrite, Bornite, Chalcocite/Covellite, Tetrahedrite/Tennantite Group Minerals, Enargite, Po-Pyrrhotite, Py-Pyrite, FeOx-Goethite, Limonite, Chromite, Hematite and Magnetite, Gn-Non-Sulphide Minerals

TABLE V-1F
COMPARATIVE ASSAY TABLE
Marathon Tailing, 99µm K80

Methods	Fe	S
Qemscan	6.3	0.7
Chemical	6.2	0.7

Notes 1) This table compares the chemical composition of the samples determined by chemical analysis with the composition determined by QEMSCAN analysis.

TABLE V-1G
THE WEIGHT OF THE OBSERVED MINERALS
Marathon Tailing, 99µm K80

Mineral	Mineral Assays (percent)					
	>106µm	<106>53µm	<53µm>C3	<C3>C5	<C5	Total
Pentlandite	0.00	0.00	0.01	0.02	0.09	0.02
Chalcopyrite	0.07	0.07	0.07	0.06	0.10	0.07
Covellite	0.00	0.00	0.00	0.00	0.02	0.00
Sphalerite	0.00	0.00	0.06	0.01	0.44	0.08
Pyrrhotite	0.09	0.27	1.16	2.86	6.39	1.67
Pyrite	0.01	0.02	0.03	0.02	0.22	0.05
Fe Oxides	0.32	0.44	1.68	2.34	4.92	1.61
Feldspars	45.3	44.1	37.2	41.5	30.2	40.2
Pyroxene	39.7	38.4	38.9	31.3	11.8	34.0
Hornblende	2.80	2.27	4.11	5.23	21.3	5.98
Chlorite	1.99	1.58	1.86	3.60	7.21	2.79
Micas	3.05	3.07	1.94	2.98	2.86	2.75
Quartz	1.40	1.11	1.32	1.63	0.99	1.25
Ti-Minerals	2.16	4.67	7.23	3.17	4.05	4.62
'Kaolinite' (clay)	0.17	0.18	0.21	0.53	1.99	0.49
Talc	1.21	1.76	1.34	1.45	1.40	1.47
Epidote	0.22	0.17	0.17	0.24	0.19	0.19
Apatite	0.46	0.97	1.04	0.83	0.98	0.89
Carbonates	0.33	0.18	0.50	0.77	2.01	0.62
Garnet	0.23	0.23	0.27	0.41	0.90	0.36
Olivine	0.30	0.36	0.62	0.57	0.39	0.44
Others	0.23	0.22	0.25	0.48	1.55	0.46
Total	100	100	100	100	100	100

Note: 1) Fe Oxides includes Goethite, Limonite, Chromite, Hematite and Magnetite.
2) Feldspars includes Plagioclase Feldspar, K-Feldspar and Feldspar-Albite.
3) Chlorite includes Serpentine and Tourmaline.
4) Micas includes Muscovite and Biotite/Phlogopite.
5) Quartz includes Wallastonite and Zircon
6) Ti-Minerals includes Ti-Hematite, Ilmenite, Sphene and Rutile/Anatase
7) Carbonates includes Calcite, Dolomite, Magnesite and Ankerite.
8) Garnet includes Almandine, Grossular, and Andradite.
9) Others includes trace amounts of Molybdenite, Jarosite and unresolved mineral species.

TABLE V-2A
SUMMARY OF PERCENT LIBERATION BY SIZE AND CLASS
Rougher Tailing - Test 2
KM2475

Size Range	>106µm					<106>53µm					<53µm>C3				
Mineral Status	Pe	Cs	Po	Py	Gn	Pe	Cs	Po	Py	Gn	Pe	Cs	Po	Py	Gn
Liberated	0.0	0.0	0.0	0.0	16.7	0.0	0.0	5.0	0.0	35.5	0.0	3.4	8.9	4.6	26.5
Binary - Pe	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Binary - Cs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.4	0.0
Binary - Po	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Binary - Py	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	0.0	0.0	0.0
Binary - Gn	0.0	2.3	0.8	0.0	0.0	0.0	6.3	8.8	0.1	0.0	0.0	20.2	12.5	9.0	0.0
Multiphase	0.0	11.0	1.1	1.1	0.0	0.0	25.7	7.0	1.0	0.0	0.0	6.2	1.2	37.2	0.0
Total	0.0	13.3	1.9	1.1	16.8	0.0	32.0	20.9	1.1	35.6	0.0	31.4	22.6	56.1	26.6

Size Range	<C3>C5					<C5				
Mineral Status	Pe	Cs	Po	Py	Gn	Pe	Cs	Po	Py	Gn
Liberated	0.0	1.8	4.8	6.1	11.5	0.0	6.6	26.8	9.6	9.6
Binary - Pe	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Binary - Cs	0.0	0.0	0.1	2.1	0.0	0.0	0.0	0.0	3.3	0.0
Binary - Po	0.0	0.4	0.0	1.4	0.0	0.0	3.3	0.0	2.1	0.0
Binary - Py	0.0	0.7	0.3	0.0	0.0	0.0	0.0	0.6	0.0	0.0
Binary - Gn	0.0	8.4	3.4	5.0	0.0	0.0	2.0	17.8	7.9	0.0
Multiphase	0.0	0.0	0.0	1.6	0.0	0.0	0.0	0.8	2.6	0.0
Total	0.0	11.4	8.6	16.2	11.5	0.0	11.9	46.0	25.5	9.6

Mineral Status	Mineral Liberation-2 Dimensions					Mineral Liberation-3 Dimensions				
	Pe	Cs	Po	Py	Gn	Pe	Cs	Po	Py	Gn
Liberated	0.0	11.9	45.6	20.3	99.8	0.0	0.0	31.9	0.3	99.7
Binary - Pe	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Binary - Cs	0.0	0.0	0.1	10.8	0.1	0.0	0.0	0.2	13.5	0.1
Binary - Po	0.0	3.7	0.0	3.5	0.1	0.0	4.2	0.0	4.4	0.2
Binary - Py	0.0	2.2	0.9	0.0	0.0	0.0	2.5	1.1	0.0	0.0
Binary - Gn	0.0	39.3	43.3	21.9	0.0	0.0	44.6	54.2	27.4	0.0
Multiphase	0.0	42.9	10.1	43.5	0.0	0.0	48.7	12.6	54.4	0.0
Total	0.0	100	100	100	100	0.0	100	100	100	100

Notes 1) Pe-Pentlandite, Cs-Copper Sulphides including Chalcopyrite and Chalcocite/Covellite, Po-Pyrrhotite, Py-Pyrite, Gn-Non-Sulphide Minerals.

2) 0.0 Indicates these minerals were not observed during the counting procedure.

3) The 106µm and 53µm sizing fraction corresponds to the Tyler 150 and 270 mesh sieves. C1 to C5 indicates cyclones 1 to 5 on the cyclosizer.

4) The Total line is the distribution of mineral in the size fraction. Original data is from the size by assay and distribution tables.

5) The calculated liberation of the unsized product as measured in two dimensions has been converted to three dimensions using correction factors developed by G & T Metallurgical Services.

6) The three dimension liberation is zero if the liberation in two dimensions is less than 20 percent.

TABLE V-2B
SIZE BY ASSAY AND DISTRIBUTION BASED ON METAL CONTENT
Rougher Tailing - Test 2

Size Fraction	Mass %	Assays-percent					Distribution				
		Fe	S				Fe	S			
>106µm	16.7	2.99	0.05				9.6	4.7			
<106>53µm	35.5	4.49	0.09				30.5	17.1			
<53µm>C3	26.6	6.30	0.20				32.0	29.6			
<C3>C5	11.5	5.47	0.14				12.0	9.1			
<C5	9.7	8.60	0.73				15.9	39.5			
Total	100	5.23	0.18				100	100			

TABLE V-2C
SIZE BY ASSAY AND DISTRIBUTION BASED ON MINERAL CONTENT
Rougher Tailing - Test 2

Size Fraction	Mass %	Assays-percent					Distribution				
		Pe	Cs	Po	Py	Gn	Pe	Cs	Po	Py	Gn
>106µm	16.7	0.00	0.04	0.03	0.00	99.9	2.2	13.3	1.9	1.1	16.8
<106>53µm	35.5	0.00	0.05	0.16	0.00	99.8	2.8	32.0	20.9	1.1	35.6
<53µm>C3	26.6	0.01	0.06	0.23	0.12	99.6	34.7	31.4	22.6	56.1	26.6
<C3>C5	11.5	0.01	0.05	0.21	0.08	99.7	9.5	11.4	8.6	16.2	11.5
<C5	9.7	0.06	0.06	1.31	0.15	98.4	50.8	11.9	46.0	25.5	9.6
Total	100	0.01	0.05	0.28	0.06	99.6	100	100	100	100	100

Notes: 1) Pe-Pentlandite, Cs-Copper Sulphides including Chalcopyrite and Chalcocite/Covellite, Po-Pyrrhotite, Py-Pyrite, Gn-Non-Sulphide Minerals.

2) Mineral assays are based on gravimetric factors to convert the metal to the pure mineral.

3) See appendix I for details of gravimetric factors.

4) An assay value of "0" indicates the assay value is less than the detection limit.

TABLE V-2D
ESTIMATED RELATIVE PROPORTION AND COMPOSITION OF MINERAL GRAINS
Rougher Tailing - Test 2

Binary Component	Proportion by Weight-2D					Proportion by Weight-3D					Composition of Grains				
	Pe	Cs	Po	Py	Gn	Pe	Cs	Po	Py	Gn	Pe	Cs	Po	Py	Gn
Liberated	0.00	0.01	0.13	0.01	99.4	0.00	0.00	0.09	0.00	99.3	0	100	100	100	100
Binary - Pe	0.00	0.00	0.00	0.00	0.0	0.00	0.00	0.00	0.00	0.0	0	0	0	0	0
Binary - Cs	0.00	0.00	0.01	0.1	0.00	0.00	0.00	0.01	0.1	0	0	18	86	74	74
Binary - Po	0.00	0.00	0.00	0.1	0.00	0.00	0.00	0.00	0.2	0	0	82	45	51	51
Binary - Py	0.00	0.00	0.00	0.0	0.00	0.00	0.00	0.00	0.0	0	0	14	55	28	28
Binary - Gn	0.00	0.02	0.12	0.01	0.00	0.02	0.15	0.02	0.02	0	26	49	72	72	72
Multiphase	0.00	0.02	0.03	0.02	0.0	0.00	0.02	0.03	0.03	0.0	0	20	28	24	28
Average Composition	0.00	0.05	0.28	0.06	99.6	0.00	0.05	0.28	0.06	99.6	0	23	52	35	100

Notes 1) The two-dimensional proportion of minerals is a weighted estimate which is based on the liberation and the mineral content of the unsized sample.

2) The three-dimensional data is based on converting the two dimensional liberation data using G & T Metallurgical Services correction factors.

3) Composition values of "0" represents values <2% and "100" represents values >98%.

TABLE V-2E
DISTRIBUTION BY SIZE RANGE OF IRON SULPHIDES MINERALS
Rougher Tailing - Test 2

Size Fraction	Mass %	% Sulphur Bearing Minerals						% Sulphur of Total Sulphur						% Iron of Total Iron				
		Pe	Cs	Sp	Po	Py	Ot	Pe	Cs	Sp	Po	Py	Ot	Cs	Po	Py	FeOx	Gn
>106µm	16.7	1.8	50.6	0.8	39.3	4.8	2.7	1.7	48.5	0.7	40.7	7.0	1.4	0.5	0.8	0.0	2.9	95.9
<106>53µm	35.5	0.4	21.9	0.0	76.7	0.8	0.2	0.4	20.5	0.0	77.9	1.2	0.1	0.3	4.2	0.0	7.2	88.3
<53µm>C3	26.6	3.3	14.1	0.0	54.6	27.8	0.2	3.1	13.1	0.0	56.1	27.6	0.1	0.2	3.1	0.7	8.6	87.3
<C3>C5	11.5	2.4	13.2	7.7	54.0	20.8	1.8	2.1	11.0	6.4	50.9	27.8	1.7	0.2	2.6	0.7	22.2	74.3
<C5	9.7	3.1	3.4	13.0	71.5	8.2	0.7	2.9	3.0	11.5	72.0	10.2	0.3	0.2	11.3	0.5	32.5	55.5
Total	100	2.59	12.1	6.29	65.1	13.4	0.64	2.39	11.9	5.19	64.9	15.3	0.39	0.3	3.8	0.3	11.0	84.5

Notes 1) Pe-Pentlandite, Cs-Copper Sulphides including Chalcocopyrite and Chalcocite/Covellite, Sp-Sphalerite, Po-Pyrrhotite, Py-Pyrite, Ot-Other Sulphides including trace amount of Molybdenite, Jarosite and Calcium Sulphate.

2) Cs-Chalcocopyrite, Bornite, Chalcocite/Covellite, Tetrahedrite/Tennantite Group Minerals, Enargite, Po-Pyrrhotite, Py-Pyrite, FeOx-Goethite, Limonite, Chromite, Hematite and Magnetite, Gn-Non-Sulphide Minerals

TABLE V-2F
COMPARATIVE ASSAY TABLE
Rougher Tailing - Test 2

Methods	Fe	S
Qemscan	5.5	0.2
Chemical	5.2	0.2

Notes 1) This table compares the chemical composition of the samples determined by chemical analysis with the composition determined by QEMSCAN analysis.

TABLE V-2G
THE WEIGHT OF THE OBSERVED MINERALS
Rougher Tailing - Test 2

Mineral	Mineral Assays (percent)					
	>106µm	<106>53µm	<53µm>C3	<C3>C5	<C5	Total
Pentlandite	0.00	0.00	0.01	0.01	0.06	0.01
Chalcopyrite	0.04	0.05	0.05	0.04	0.06	0.05
Covellite	0.00	0.00	0.01	0.01	0.00	0.00
Sphalerite	0.00	0.00	0.00	0.03	0.24	0.03
Pyrrhotite	0.03	0.16	0.23	0.21	1.31	0.28
Pyrite	0.00	0.00	0.12	0.08	0.15	0.06
Fe Oxides	0.16	0.85	0.96	1.83	4.33	1.21
Feldspars	50.7	39.6	39.9	45.0	33.3	41.5
Pyroxene	35.1	38.8	37.4	29.4	11.3	34.1
Hornblende	2.53	4.00	3.87	5.65	24.0	5.85
Chlorite	1.93	2.18	2.43	4.06	7.76	2.96
Micas	4.09	3.37	2.50	3.39	3.17	3.24
Quartz	1.80	0.59	1.28	1.91	1.00	1.17
Ti-Minerals	1.02	6.59	6.56	3.31	4.05	5.03
'Kaolinite' (clay)	0.18	0.16	0.21	0.45	2.23	0.41
Talc	1.09	1.26	1.77	0.84	0.45	1.24
Epidote	0.21	0.35	0.20	0.26	0.21	0.26
Apatite	0.17	0.97	0.98	0.88	0.92	0.82
Carbonates	0.32	0.64	0.49	1.09	2.06	0.74
Garnet	0.29	0.29	0.35	0.51	1.14	0.41
Olivine	0.24	0.05	0.48	0.51	0.34	0.28
Others	0.13	0.14	0.22	0.49	1.88	0.37
Total	100	100	100	100	100	100

Note: 1) Fe Oxides includes Goethite, Limonite, Chromite, Hematite and Magnetite.
2) Feldspars includes Plagioclase Feldspar, K-Feldspar and Feldspar-Albite.
3) Chlorite includes Serpentine and Tourmaline.
4) Micas includes Muscovite and Biotite/Phlogopite.
5) Quartz includes Wallastonite and Zircon
6) Ti-Minerals includes Ti-Hematite, Ilmenite, Sphene and Rutile/Anatase
7) Carbonates includes Calcite, Dolomite, Magnesite and Ankerite.
8) Garnet includes Almandine, Grossular, and Andradite.
9) Others includes trace amounts of Molybdenite, Jarosite and unresolved mineral species.

APPENDIX 3

Compilation of Data from Laboratory Testing

Summary of Results from Humidity Cell Tests on Rock Samples

Humidity Cell Results from Sample MAR07-92

Analyte	Unit	Wk#0	Wk#1	Wk#2	Wk#3	Wk#4	Wk#5	Wk#6	Wk#7	Wk#8	Wk#9	Wk#10
		CA10583-SEP07 25-Sep-07	CA10037-OCT07 02-Oct-07	CA10252-OCT07 09-Oct-07	CA10377-OCT07 16-Oct-07	CA10615-OCT07 23-Oct-07	CA10756-OCT07 30-Oct-07	CA10043-NOV07 06-Nov-07	CA10244-NOV07 13-Nov-07	CA10377-NOV07 20-Nov-07	CA10610-NOV07 27-Nov-07	CA10008-DEC07 04-Dec-07
Leachate Volume Added	mL	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Leachate Volume Recovered	mL	824	968	954	962	902	897	909	830	856	NA	879
pH	-	7.69	7.76	7.87	7.31	7.92	7.53	7.62	7.48	7.33	7.32	7.34
Acidity	mg/L as CaCO3	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Alkalinity	mg/L as CaCO3	15	22	21	15	13	11	10	11	10	9	8
Conductivity	µS/cm	41	56	47	41	34	28	26	26	27	22	19
Sulphate	mg/L	< 0.5	1.0	0.9	0.7	0.6	0.5	0.5	0.7	0.5	< 0.5	< 0.5
Calcium (Ca)	mg/L	2.42	2.66	2.02	2.13	1.56	1.45	1.31	1.24	1.12	1.2	1.2
Iron (Fe)	mg/L	< 0.01	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Silver (Ag)	mg/L	< 0.00001	< 0.00001	< 0.00001			< 0.00001					< 0.00001
Aluminum (Al)	mg/L	0.04	0.03	0.03			0.02					0.02
Arsenic (As)	mg/L	0.0010	0.0017	0.0014			0.0010					< 0.0002
Barium (Ba)	mg/L	0.00026	0.00043	0.00034			0.00044					0.0002
Beryllium (Be)	mg/L	< 0.00002	< 0.00002	< 0.00002			< 0.00002					< 0.00002
Boron (B)	mg/L	0.0023	0.0056	0.0040			0.0029					0.0011
Bismuth (Bi)	mg/L	< 0.00001	< 0.00001	< 0.00001			< 0.00001					< 0.00001
Cadmium (Cd)	mg/L	< 0.000003	< 0.000003	< 0.000003			0.000013					< 0.000003
Cobalt (Co)	mg/L	0.000054	0.000247	0.000045			0.000013					0.000017
Chromium (Cr)	mg/L	< 0.0005	< 0.0005	< 0.0005			< 0.0005					< 0.0005
Copper (Cu)	mg/L	< 0.0005	< 0.0005	< 0.0005			0.0011					< 0.0005
Potassium (K)	mg/L	0.36	0.43	0.39			0.29					0.24
Lithium (Li)	mg/L	< 0.0007	< 0.0007	< 0.0007			0.0015					< 0.0007
Magnesium (Mg)	mg/L	0.269	0.365	0.304			0.252					0.235
Manganese (Mn)	mg/L	0.0162	0.0223	0.0201			0.0130					0.00602
Molybdenum (Mo)	mg/L	0.00646	0.0192	0.0131			0.00554					0.00244
Nickel (Ni)	mg/L	0.0001	0.0004	0.0002			0.0002					< 0.0001
Lead (Pb)	mg/L	0.00003	0.00023	0.00009			0.00044					< 0.00002
Antimony (Sb)	mg/L	0.00070	0.00203	0.00187			0.00107					0.00044
Selenium (Se)	mg/L	< 0.001	< 0.001	< 0.001			< 0.001					< 0.001
Tin (Sn)	mg/L	0.0112	0.00889	0.00408			0.00213					0.00059
Strontium (Sr)	mg/L	0.0114	0.0157	0.0131			0.0101					0.0098
Titanium (Ti)	mg/L	< 0.0001	0.0001	< 0.0001			0.0002					< 0.0001
Thallium (Tl)	mg/L	< 0.00001	< 0.00001	< 0.00001			1E-05					< 0.000002
Uranium (U)	mg/L	0.000500	0.00461	0.00549			0.00395					0.00267
Vanadium (V)	mg/L	0.00177	0.00183	0.00142			0.00108					0.00084
Tungsten (W)	mg/L	0.00046	0.00238	0.00138			0.00057					0.00036
Yttrium (Y)	mg/L	0.000056	0.000151	0.000081			0.000043					0.000028
Zinc (Zn)	mg/L	0.001	0.002	0.001			0.014					0.001

Week#0 signifies the initial flooding of the humidity cell initiating the 20 week test period.

Humidity Cell Results from Sample MAR07-92

Analyte	Unit	Wk#11	Wk#12	Wk#13	Wk#14	Wk#15	Wk#16	Wk#17	Wk#18	Wk#19	Wk#20	Wk#21
		CA10163-DEC07 39427.63889	CA10307-DEC07 39435.63889	CA10483-DEC07 39440.62292	CA10001-JAN08 39449.65417	CA10088-JAN08 39455.63889	CA10221-JAN08 16-Jan-08	CA10366-JAN08 22-Jan-08	CA10526-JAN08 29-Jan-08	CA10012-FEB08 05-Feb-08	CA10179-FEB08 12-Feb-08	CA10305-FEB08 19-Feb-08
Leachate Volume Added	mL	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Leachate Volume Recovered	mL	858	877	872	950	899	921	896	888	913	891	858
pH	-	6.91	6.91	7.09	7.07	7.21	7.18	7.11	7.45	7.18	7.11	4.91
Acidity	mg/L as CaCO3	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Alkalinity	mg/L as CaCO3	9	10	8	13	8	9	7	8	7	6	6
Conductivity	µS/cm	20	16	19	25	21	23	20	21	19	19	17
Sulphate	mg/L	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Calcium (Ca)	mg/L	1.14	1.31	1.23	2.25	1.89	1.89	1.60	2.06	1.94	1.62	1.61
Iron (Fe)	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Silver (Ag)	mg/L					< 0.00001					< 0.00001	
Aluminum (Al)	mg/L					0.03					0.03	
Arsenic (As)	mg/L					0.0003					< 0.0002	
Barium (Ba)	mg/L					0.00031					0.00019	
Beryllium (Be)	mg/L					< 0.00002					< 0.00002	
Boron (B)	mg/L					0.001					< 0.0002	
Bismuth (Bi)	mg/L					< 0.00001					< 0.00001	
Cadmium (Cd)	mg/L					< 0.000003					< 0.000003	
Cobalt (Co)	mg/L					0.000018					0.000016	
Chromium (Cr)	mg/L					< 0.0005					< 0.0005	
Copper (Cu)	mg/L					< 0.0005					< 0.0005	
Potassium (K)	mg/L					0.24					0.14	
Lithium (Li)	mg/L					0.001					< 0.001	
Magnesium (Mg)	mg/L					0.34					0.305	
Manganese (Mn)	mg/L					0.0109					0.00777	
Molybdenum (Mo)	mg/L					0.00122					0.00104	
Nickel (Ni)	mg/L					< 0.0001					< 0.0001	
Lead (Pb)	mg/L					< 0.00002					0.00012	
Antimony (Sb)	mg/L					0.00031					0.00035	
Selenium (Se)	mg/L					< 0.001					< 0.001	
Tin (Sn)	mg/L					0.00036					0.00012	
Strontium (Sr)	mg/L					0.0144					0.0121	
Titanium (Ti)	mg/L					< 0.0001					< 0.0001	
Thallium (Tl)	mg/L					< 0.000002					< 0.000002	
Uranium (U)	mg/L					0.00131					0.00072	
Vanadium (V)	mg/L					0.00065					0.00031	
Tungsten (W)	mg/L					0.00009					0.00006	
Yttrium (Y)	mg/L					0.000022					0.000006	
Zinc (Zn)	mg/L					< 0.001					< 0.001	

Week#0 signifies the initial flooding of the humidity cell initiating the 20 week test period.

Humidity Cell Results from Sample MAR07-92

Analyte	Unit	Wk#22	Wk#23	Wk#24	Wk#25	Wk#26	Wk#27
		CA10425-FEB08 26-Feb-08	CA10014-MAR08 4-Mar-08	CA10155-MAR08 11-Mar-08	CA10275-MAR08 18-Mar-08	CA10378-MAR08 25-Mar-08	CA10017-APR08 01-Apr-08
Leachate Volume Added	mL	1000	1000	1000	1000	1000	1000
Leachate Volume Recovered	mL	846	884	912	896	916	920
pH	-	7.64	7.41	7.19	7.19	7.21	6.09
Acidity	mg/L as CaCO3	< 2	< 2	< 2	< 2	< 2	< 2
Alkalinity	mg/L as CaCO3	8	14	7	7	8	< 2
Conductivity	µS/cm	36	30	20	18	20	19
Sulphate	mg/L	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Calcium (Ca)	mg/L	2.03	3.76	2.28	2.13	2.12	2.22
Iron (Fe)	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Silver (Ag)	mg/L				< 0.00001		
Aluminum (Al)	mg/L				0.04		
Arsenic (As)	mg/L				< 0.0002		
Barium (Ba)	mg/L				0.0004		
Beryllium (Be)	mg/L				< 0.00002		
Boron (B)	mg/L				0.0007		
Bismuth (Bi)	mg/L				< 0.00001		
Cadmium (Cd)	mg/L				< 0.000003		
Cobalt (Co)	mg/L				0.000011		
Chromium (Cr)	mg/L				< 0.0005		
Copper (Cu)	mg/L				< 0.0005		
Potassium (K)	mg/L				0.23		
Lithium (Li)	mg/L				< 0.001		
Magnesium (Mg)	mg/L				0.433		
Manganese (Mn)	mg/L				0.0116		
Molybdenum (Mo)	mg/L				0.00103		
Nickel (Ni)	mg/L				< 0.0001		
Lead (Pb)	mg/L				0.00006		
Antimony (Sb)	mg/L				0.0004		
Selenium (Se)	mg/L				< 0.001		
Tin (Sn)	mg/L				0.00039		
Strontium (Sr)	mg/L				0.0187		
Titanium (Ti)	mg/L				0.0001		
Thallium (Tl)	mg/L				< 0.000002		
Uranium (U)	mg/L				0.000697		
Vanadium (V)	mg/L				0.00059		
Tungsten (W)	mg/L				0.00017		
Yttrium (Y)	mg/L				0.00001		
Zinc (Zn)	mg/L				< 0.001		

Week#0 signifies the initial flooding of the humidity cell initiating the 20 week test period.

Humidity Cell Results from Sample MAR07-18

Analyte	Unit	Wk#0	Wk#1	Wk#2	Wk#3	Wk#4	Wk#5	Wk#6	Wk#7	Wk#8	Wk#9	Wk#10
		CA10583-SEP07	CA10037-OCT07	CA10252-OCT07	CA10377-OCT07	CA10615-OCT07	CA10756-OCT07	CA10043-NOV07	CA10244-NOV07	CA10377-NOV07	CA10610-NOV07	CA10008-DEC07
		25-Sep-07	02-Oct-07	09-Oct-07	16-Oct-07	23-Oct-07	30-Oct-07	06-Nov-07	13-Nov-07	20-Nov-07	27-Nov-07	04-Dec-07
Leachate Volume Added	mL	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Leachate Volume Recovered	mL	806	964	966	983	932	921	935	923	912	NA	910
pH	-	8.03	8.08	8.35	7.67	8.42	7.96	8.21	7.58	7.46	7.48	7.65
Acidity	mg/L as CaCO3	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Alkalinity	mg/L as CaCO3	16	27	27	22	17	15	17	14	22	13	14
Conductivity	µS/cm	51	83	71	59	48	44	51	37	41	63	39
Sulphate	mg/L	5.9	10	6.6	4.3	2.8	2.7	3	2.4	2.4	2.2	2.1
Calcium (Ca)	mg/L	2.80	2.57	2.17	2.31	1.73	1.78	2.1	1.83	1.99	2.02	1.91
Iron (Fe)	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Silver (Ag)	mg/L	0.00004	< 0.00001	< 0.00001			< 0.00001					0.00003
Aluminum (Al)	mg/L	0.03	0.03	0.04			0.04					0.03
Arsenic (As)	mg/L	0.0018	0.0038	0.0039			0.0027					0.0105
Barium (Ba)	mg/L	0.00339	0.00408	0.00403			0.00313					0.00063
Beryllium (Be)	mg/L	0.00005	< 0.00002	< 0.00002			< 0.00002					< 0.00002
Boron (B)	mg/L	0.0021	0.0040	0.0027			0.0032					0.0033
Bismuth (Bi)	mg/L	0.00003	< 0.00001	< 0.00001			< 0.00001					< 0.00001
Cadmium (Cd)	mg/L	< 0.000003	< 0.000003	< 0.000003			< 0.000003					< 0.000003
Cobalt (Co)	mg/L	0.000183	0.000263	0.000232			0.000137					0.000013
Chromium (Cr)	mg/L	< 0.0005	< 0.0005	< 0.0005			< 0.0005					< 0.0005
Copper (Cu)	mg/L	< 0.0005	0.0006	0.0006			0.0010					0.0013
Potassium (K)	mg/L	1.95	4.85	4.95			4.03					1.05
Lithium (Li)	mg/L	0.0026	0.0046	0.0032			0.0046					0.0011
Magnesium (Mg)	mg/L	0.310	0.394	0.352			0.346					0.065
Manganese (Mn)	mg/L	0.00868	0.00939	0.00744			0.00563					0.00345
Molybdenum (Mo)	mg/L	0.00464	0.0195	0.0130			0.00910					0.00064
Nickel (Ni)	mg/L	0.0003	0.0008	0.0004			0.0003					0.0002
Lead (Pb)	mg/L	< 0.00002	0.00006	0.00005			0.00022					0.00003
Antimony (Sb)	mg/L	0.00055	0.00089	0.00103			0.00081					0.00033
Selenium (Se)	mg/L	< 0.001	< 0.001	< 0.001			< 0.001					0.002
Tin (Sn)	mg/L	0.0116	0.00518	0.00321			0.00158					0.0004
Strontium (Sr)	mg/L	0.0183	0.0211	0.0184			0.0162					0.0157
Titanium (Ti)	mg/L	0.0003	0.0004	0.0001			0.0006					< 0.0001
Thallium (Tl)	mg/L	< 0.00001	< 0.00001	< 0.00001			0.00002					0.000002
Uranium (U)	mg/L	0.000020	0.000092	0.000116			0.000225					0.000004
Vanadium (V)	mg/L	0.00285	0.00442	0.00487			0.00303					0.00053
Tungsten (W)	mg/L	0.00052	0.00160	0.00088			0.00020					0.00026
Yttrium (Y)	mg/L	0.000004	0.000003	0.000002			0.000004					0.000001
Zinc (Zn)	mg/L	0.002	0.001	0.001			0.011					< 0.001

Week#0 signifies the initial flooding of the humidity cell initiating the 20 week test period.

Humidity Cell Results from Sample MAR07-18

Analyte	Unit	Wk#11	Wk#12	Wk#13	Wk#14	Wk#15	Wk#16	Wk#17	Wk#18	Wk#19	Wk#20	Wk#21
		CA10163-DEC07	CA10307-DEC07	CA10483-DEC07	CA10001-JAN08	CA10088-JAN08	CA10221-JAN08	CA10366-JAN08	CA10526-JAN08	CA10012-FEB08	CA10179-FEB08	CA10305-FEB08
		11-Dec-07	19-Dec-07	24-Dec-07	02-Jan-08	08-Jan-08	16-Jan-08	22-Jan-08	29-Jan-08	05-Feb-08	12-Feb-08	19-Feb-08
Leachate Volume Added	mL	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Leachate Volume Recovered	mL	945	955	920	983	971	959	911	939	938	958	921
pH	-	7.19	7.22	7.44	7.49	7.85	7.69	7.56	7.77	7.55	7.5	7.51
Acidity	mg/L as CaCO3	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Alkalinity	mg/L as CaCO3	16	16	16	16	22	20	18	17	15	16	22
Conductivity	µS/cm	46	38	42	50	51	47	47	45	38	41	80
Sulphate	mg/L	2.2	1.8	1.5	1.6	1.5	1.4	1.5	1.4	1.3	1.4	1.5
Calcium (Ca)	mg/L	2.77	3.13	2.74	3.67	4.69	3.64	3.95	4.08	3.73	3.79	4.12
Iron (Fe)	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Silver (Ag)	mg/L					< 0.00001					< 0.00001	
Aluminum (Al)	mg/L					0.29					0.09	
Arsenic (As)	mg/L					0.0026					0.0012	
Barium (Ba)	mg/L					0.00795					0.00693	
Beryllium (Be)	mg/L					< 0.00002					< 0.00002	
Boron (B)	mg/L					0.001					0.0006	
Bismuth (Bi)	mg/L					< 0.00001					< 0.00001	
Cadmium (Cd)	mg/L					0.000003					< 0.000003	
Cobalt (Co)	mg/L					0.000217					0.000223	
Chromium (Cr)	mg/L					< 0.0005					< 0.0005	
Copper (Cu)	mg/L					< 0.0005					< 0.0005	
Potassium (K)	mg/L					5.87					4.13	
Lithium (Li)	mg/L					0.005					0.002	
Magnesium (Mg)	mg/L					0.873					0.674	
Manganese (Mn)	mg/L					0.00868					0.00891	
Molybdenum (Mo)	mg/L					0.00099					0.00078	
Nickel (Ni)	mg/L					< 0.0001					0.0001	
Lead (Pb)	mg/L					< 0.00002					< 0.00002	
Antimony (Sb)	mg/L					0.00027					0.00019	
Selenium (Se)	mg/L					< 0.001					< 0.001	
Tin (Sn)	mg/L					0.00036					0.00014	
Strontium (Sr)	mg/L					0.0378					0.0315	
Titanium (Ti)	mg/L					0.0003					< 0.0001	
Thallium (Tl)	mg/L					< 0.000002					< 0.000002	
Uranium (U)	mg/L					0.000098					0.000044	
Vanadium (V)	mg/L					0.00326					0.00136	
Tungsten (W)	mg/L					< 0.00003					< 0.00003	
Yttrium (Y)	mg/L					< 0.000001					< 0.000001	
Zinc (Zn)	mg/L					< 0.001					< 0.001	

Week#0 signifies the initial flooding of the humidity cell initiating the 20 week test period.

Humidity Cell Results from Sample MAR07-18

Analyte	Unit	Wk#22	Wk#23	Wk#24	Wk#25	Wk#26	Wk#27	Wk#28	Wk#29	Wk#30	Wk#31	Wk#32
		CA10425-FEB08	CA10014-MAR08	CA10155-MAR08	CA10275-MAR08	CA10378-MAR08	CA10017-APR08	CA10186-APR08	CA10299-APR08	CA10503-APR08	CA10616-APR08	CA10074-MAY08
		26-Feb-08	04-Mar-08	11-Mar-08	18-Mar-08	25-Mar-08	01-Apr-08	08-Apr-08	15-Apr-08	22-Apr-08	29-Apr-08	06-May-08
Leachate Volume Added	mL	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Leachate Volume Recovered	mL	899	906	931	960	948	954	936	979	978	983	932
pH	-	7.71	7.41	7.73	7.6	7.54	7.20	7.39	7.44	7.42	7.70	7.62
Acidity	mg/L as CaCO3	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Alkalinity	mg/L as CaCO3	16	16	16	16	17	16	17	20	15	17	16
Conductivity	µS/cm	43	60	40	40	44	43	47	49	44	42	44
Sulphate	mg/L	1.4	1.5	1.3	1.7	1.4	1.6	1.6	1.9	1.8	1.8	1.6
Calcium (Ca)	mg/L	4.3	4.46	4.03	4.29	4.81	5.33	4.71	5.16	4.69	4.8	4.53
Iron (Fe)	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Silver (Ag)	mg/L				< 0.00001					< 0.00001		
Aluminum (Al)	mg/L				0.13					0.14		
Arsenic (As)	mg/L				0.0013					0.0016		
Barium (Ba)	mg/L				0.00787					0.00785		
Beryllium (Be)	mg/L				< 0.00002					< 0.00002		
Boron (B)	mg/L				0.0006					< 0.0002		
Bismuth (Bi)	mg/L				< 0.00001					0.00001		
Cadmium (Cd)	mg/L				< 0.000003					< 0.000003		
Cobalt (Co)	mg/L				0.000187					0.000166		
Chromium (Cr)	mg/L				< 0.0005					< 0.0005		
Copper (Cu)	mg/L				< 0.0005					0.001		
Potassium (K)	mg/L				4.25					3.67		
Lithium (Li)	mg/L				0.004					0.001		
Magnesium (Mg)	mg/L				0.65					0.564		
Manganese (Mn)	mg/L				0.00934					0.0105		
Molybdenum (Mo)	mg/L				0.00041					0.00034		
Nickel (Ni)	mg/L				0.0002					< 0.0001		
Lead (Pb)	mg/L				< 0.00002					< 0.00002		
Antimony (Sb)	mg/L				0.00022					0.00015		
Selenium (Se)	mg/L				< 0.001					< 0.001		
Tin (Sn)	mg/L				0.00033					0.00038		
Strontium (Sr)	mg/L				0.0336					0.0331		
Titanium (Ti)	mg/L				0.0002					0.0002		
Thallium (Tl)	mg/L				< 0.000002					< 0.000002		
Uranium (U)	mg/L				0.00004					0.000046		
Vanadium (V)	mg/L				0.00168					0.00131		
Tungsten (W)	mg/L				0.00014					< 0.00003		
Yttrium (Y)	mg/L				< 0.000001					< 0.000001		
Zinc (Zn)	mg/L				0.001					< 0.001		

Week#0 signifies the initial flooding of the humidity cell initiating the 20 week test period.

Humidity Cell Results from Sample MAR07-18

Analyte	Unit	Wk#33	Wk#34	Wk#35	Wk#36	Wk#37	Wk#38	Wk#39	Wk#40	Wk#41	Wk#42	Wk#43	Wk#44
		CA10110-MAY08 13-May-08	CA10136-MAY08 20-May-08	CA10666-MAY08 27-May-08	CA10007-JUN08 03-Jun-08	CA10038-JUN08 10-Jun-08	CA10088-JUN08 17-Jun-08	CA10368-JUN08 24-Jun-08	CA10009-JUL08 01-Jul-08	CA10036-JUL08 08-Jul-08	CA10113-JUL08 15-Jul-08	CA10139-JUL08 22-Jul-08	CA10444-JUL08 29-Jul-08
Leachate Volume Added	mL	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Leachate Volume Recovered	mL	980	966	896	958	950	967	972	983	982	981	972	981
pH	-	7.36	7.6	7.68	7.73	7.63	7.66	7.47	7.63	7.46	7.26	7.15	7.29
Acidity	mg/L as CaCO3	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Alkalinity	mg/L as CaCO3	16	16	15	17	20	18	16	17	17	20	19	16
Conductivity	µS/cm	46	44	43	42	39	39	39	43	46	44	43	48
Sulphate	mg/L	1.7	1.7	1.4	1.7	1.4	1.6	1.9	1.7	2	1.9	1.9	1.8
Calcium (Ca)	mg/L	4.96	4.83	4.45	4.53	4.92	4.88	5.2	5.15	5.35	5.59	5.25	5.33
Iron (Fe)	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Silver (Ag)	mg/L			< 0.00001					< 0.00001				
Aluminum (Al)	mg/L			0.15					0.15				
Arsenic (As)	mg/L			0.0019					0.0016				
Barium (Ba)	mg/L			0.00784					0.00834				
Beryllium (Be)	mg/L			< 0.00002					< 0.00002				
Boron (B)	mg/L			0.0005					0.0005				
Bismuth (Bi)	mg/L			< 0.00001					0.00001				
Cadmium (Cd)	mg/L			< 0.000003					0.000005				
Cobalt (Co)	mg/L			0.00013					0.000119				
Chromium (Cr)	mg/L			< 0.0005					< 0.0005				
Copper (Cu)	mg/L			0.0006					0.0006				
Potassium (K)	mg/L			3.63					3.3				
Lithium (Li)	mg/L			0.003					0.003				
Magnesium (Mg)	mg/L			0.522					0.523				
Manganese (Mn)	mg/L			0.00959					0.0103				
Molybdenum (Mo)	mg/L			0.00024					0.00036				
Nickel (Ni)	mg/L			< 0.0001					0.0002				
Lead (Pb)	mg/L			0.00005					0.00011				
Antimony (Sb)	mg/L			0.0002					0.00045				
Selenium (Se)	mg/L			< 0.001					< 0.001				
Tin (Sn)	mg/L			0.00025					0.00018				
Strontium (Sr)	mg/L			0.0309					0.0323				
Titanium (Ti)	mg/L			0.0002					0.0001				
Thallium (Tl)	mg/L			0.00002					0.000003				
Uranium (U)	mg/L			0.000038					0.00005				
Vanadium (V)	mg/L			0.00144					0.00122				
Tungsten (W)	mg/L			< 0.00003					0.00004				
Yttrium (Y)	mg/L			0.000002					0.000002				
Zinc (Zn)	mg/L			0.001					< 0.001				

Week#0 signifies the initial flooding of the humidity cell initiating the 20 week test period.

Humidity Cell Results from Sample MAR07-18

Analyte	Unit	Wk#45	Wk#46	Wk#47	Wk#48	Wk #49	Wk #50	Wk #51	Wk #52	Wk #53	Wk #54	Wk #55	Wk #56
		CA10009-AUG08 05-Aug-08	CA10035-AUG08 12-Aug-08	CA10417-AUG08 19-Aug-08	CA10490-AUG08 26-Aug-08	CA10007-SEP08 02-Sep-08	CA10035-SEP08 09-Sep-08	CA10199-SEP08 16-Sep-08	CA10453-SEP08 23-Sep-08	CA10613-SEP08 30-Sep-08	CA10093-OCT08 07-Oct-08	CA10259-OCT08 14-Oct-08	CA10456-OCT08 21-Oct-08
Leachate Volume Added	mL	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Leachate Volume Recovered	mL	970	974	971	907	942	982	967	979	973	987	988	988
pH	-	7.41	7.73	7.57	7.48	7.47	7.74	7.39	7.49	7.61	7.62	7.55	7.54
Acidity	mg/L as CaCO3	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Alkalinity	mg/L as CaCO3	16	15	15	15	15	14	14	14	15	15	13	13
Conductivity	µS/cm	43	52	59	41	43	35	36	35	35	37	37	35
Sulphate	mg/L	1.8	1.7	1.7	1.7	1.9	1.6	1.5	1.5	1.6	1.6	1.4	1.6
Calcium (Ca)	mg/L	5.27	5.01	5.23	5.2	5.38	4.79	4.48	4.64	4.58	4.56	4.7	4.62
Iron (Fe)	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Silver (Ag)	mg/L	0.00001					0.00004					0.00004	
Aluminum (Al)	mg/L	0.18					0.16					0.16	
Arsenic (As)	mg/L	0.0022					0.0017					0.0012	
Barium (Ba)	mg/L	0.00802					0.00696					0.00644	
Beryllium (Be)	mg/L	< 0.00002					0.00003					< 0.00002	
Boron (B)	mg/L	0.0003					0.0003					< 0.0002	
Bismuth (Bi)	mg/L	< 0.00001					0.00006					< 0.00001	
Cadmium (Cd)	mg/L	< 0.000003					0.000006					< 0.000003	
Cobalt (Co)	mg/L	0.000116					0.000078					0.000068	
Chromium (Cr)	mg/L	< 0.0005					< 0.0005					< 0.0005	
Copper (Cu)	mg/L	0.0006					0.0005					0.0005	
Potassium (K)	mg/L	3.27					2.73					2.43	
Lithium (Li)	mg/L	0.002					0.002					0.002	
Magnesium (Mg)	mg/L	0.487					0.408					0.416	
Manganese (Mn)	mg/L	0.0104					0.00845					0.0129	
Molybdenum (Mo)	mg/L	0.00021					0.00024					0.00026	
Nickel (Ni)	mg/L	0.0003					< 0.0001					0.0011	
Lead (Pb)	mg/L	< 0.00002					0.00005					< 0.00002	
Antimony (Sb)	mg/L	0.00022					0.00012					0.00039	
Selenium (Se)	mg/L	< 0.001					< 0.001					< 0.001	
Tin (Sn)	mg/L	0.00017					0.00013					0.00014	
Strontium (Sr)	mg/L	0.0314					0.0269					0.0271	
Titanium (Ti)	mg/L	< 0.0001					< 0.0001					0.0002	
Thallium (Tl)	mg/L	< 0.000002					0.000047					< 0.000002	
Uranium (U)	mg/L	0.000051					0.000264					0.00003	
Vanadium (V)	mg/L	0.00132					0.00098					0.00084	
Tungsten (W)	mg/L	< 0.00003					< 0.00003					0.00006	
Yttrium (Y)	mg/L	0.000001					0.000018					< 0.000001	
Zinc (Zn)	mg/L	< 0.001					< 0.001					< 0.001	

Week#0 signifies the initial flooding of the humidity cell initiating the 20 week test period.

Humidity Cell Results from Sample MAR07-18

Analyte	Unit	Wk #57	Wk#58	Wk#59	Wk#60	Wk#61	Wk#62	Wk#63	Wk#64	Wk#65	Wk#66	Wk#67	Wk#68
		CA10647-OCT08 28-Oct-08	CA10006-NOV08 04-Nov-08	CA10046-NOV08 11-Nov-08	CA10232-NOV08 18-Nov-08	CA10409-NOV08 25-Nov-08	CA10012-DEC08 02-Dec-08	CA10041-DEC08 09-Dec-08	CA10126-DEC08 16-Dec-08	CA10269-DEC08 23-Dec-08	CA10504-DEC08 29-Dec-08	CA10012-JAN09 06-Jan-09	CA10043-JAN09 13-Jan-09
Leachate Volume Added	mL	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Leachate Volume Recovered	mL	975	978	978	988	965	986	986	986	986	976	984	982
pH	-	7.62	7.58	7.41	7.87	7.42	7.44	7.53	7.5	7.55	7.58	7.53	7.61
Acidity	mg/L as CaCO3	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	33
Alkalinity	mg/L as CaCO3	14	14	13	13	12	12	12	12	12	12	12	12
Conductivity	µS/cm	42	42	33	35	30	33	34	32	29	33	36	33
Sulphate	mg/L	1.6	1.5	1.4	1.5	1.4	1.4	1.5	1.4	1.3	1.4	1.8	1.5
Calcium (Ca)	mg/L	4.79	5.09	4.78	4.64	4.4	4.32	4.55	4.72	4.23	4.34	4.89	4.53
Iron (Fe)	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.02	< 0.01	< 0.01
Silver (Ag)	mg/L				0.00002					0.00002			
Aluminum (Al)	mg/L				0.16					0.14			
Arsenic (As)	mg/L				0.0011					0.0015			
Barium (Ba)	mg/L				0.00826					0.00686			
Beryllium (Be)	mg/L				< 0.00002					< 0.00002			
Boron (B)	mg/L				0.0003					< 0.0002			
Bismuth (Bi)	mg/L				< 0.00001					< 0.00001			
Cadmium (Cd)	mg/L				< 0.000003					< 0.000003			
Cobalt (Co)	mg/L				0.000067					0.000074			
Chromium (Cr)	mg/L				< 0.0005					< 0.0005			
Copper (Cu)	mg/L				0.0005					0.0006			
Potassium (K)	mg/L				2.4					2.06			
Lithium (Li)	mg/L				0.001					0.002			
Magnesium (Mg)	mg/L				0.391					0.35			
Manganese (Mn)	mg/L				0.00657					0.00672			
Molybdenum (Mo)	mg/L				0.00017					0.00006			
Nickel (Ni)	mg/L				0.0002					0.0003			
Lead (Pb)	mg/L				< 0.00002					< 0.00002			
Antimony (Sb)	mg/L				< 0.0002					0.0004			
Selenium (Se)	mg/L				< 0.001					< 0.001			
Tin (Sn)	mg/L				0.00011					0.00012			
Strontium (Sr)	mg/L				0.0252					0.0226			
Titanium (Ti)	mg/L				< 0.0001					0.0001			
Thallium (Tl)	mg/L				< 0.000002					0.000004			
Uranium (U)	mg/L				0.000038					0.000408			
Vanadium (V)	mg/L				0.00083					0.00071			
Tungsten (W)	mg/L				0.00003					< 0.00003			
Yttrium (Y)	mg/L				0.000002					0.000004			
Zinc (Zn)	mg/L				0.001					0.001			

Week#0 signifies the initial flooding of the humidity cell initiating the 20 week test period.

Humidity Cell Results from Sample MAR07-18

Analyte	Unit	Wk#69	Wk#70
		CA10135-JAN-09	CA10182-JAN-09
		20-Jan-09	27-Jan-09
Leachate Volume Added	mL	1000	1000
Leachate Volume Recovered	mL	982	985
pH	-	7.71	7.6
Acidity	mg/L as CaCO ₃	< 2	< 2
Alkalinity	mg/L as CaCO ₃	12	12
Conductivity	µS/cm	34	29
Sulphate	mg/L	1.4	1.4
Calcium (Ca)	mg/L	4.55	4.26
Iron (Fe)	mg/L	< 0.01	< 0.01
Silver (Ag)	mg/L		0.00003
Aluminum (Al)	mg/L		0.14
Arsenic (As)	mg/L		0.0008
Barium (Ba)	mg/L		0.00601
Beryllium (Be)	mg/L		< 0.00002
Boron (B)	mg/L		0.0003
Bismuth (Bi)	mg/L		< 0.00001
Cadmium (Cd)	mg/L		< 0.000003
Cobalt (Co)	mg/L		0.000054
Chromium (Cr)	mg/L		< 0.0005
Copper (Cu)	mg/L		< 0.0005
Potassium (K)	mg/L		2
Lithium (Li)	mg/L		0.002
Magnesium (Mg)	mg/L		0.346
Manganese (Mn)	mg/L		0.00606
Molybdenum (Mo)	mg/L		0.00014
Nickel (Ni)	mg/L		< 0.0001
Lead (Pb)	mg/L		< 0.00002
Antimony (Sb)	mg/L		0.0002
Selenium (Se)	mg/L		< 0.001
Tin (Sn)	mg/L		0.00019
Strontium (Sr)	mg/L		0.0216
Titanium (Ti)	mg/L		< 0.0001
Thallium (Tl)	mg/L		0.000002
Uranium (U)	mg/L		0.000052
Vanadium (V)	mg/L		0.00067
Tungsten (W)	mg/L		< 0.00003
Yttrium (Y)	mg/L		0.000001
Zinc (Zn)	mg/L		< 0.001

Week#0 signifies the initial flooding of the humidity cell initiating the 20 week test period.

Humidity Cell Results from Sample MAR07-99

Analyte	Unit	Wk#0	Wk#1	Wk#2	Wk#3	Wk#4	Wk#5	Wk#6	Wk#7	Wk#8	Wk#9	Wk#10
		CA10583-SEP07	CA10037-OCT07	CA10252-OCT07	CA10377-OCT07	CA10615-OCT07	CA10756-OCT07	CA10043-NOV07	CA10244-NOV07	CA10377-NOV07	CA10610-NOV07	CA10008-DEC07
		25-Sep-07	02-Oct-07	09-Oct-07	16-Oct-07	23-Oct-07	30-Oct-07	06-Nov-07	13-Nov-07	20-Nov-07	27-Nov-07	04-Dec-07
Leachate Volume Added	mL	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Leachate Volume Recovered	mL	826	954	971	956	917	914	912	262	888	NA	910
pH	-	8.41	8.13	8.67	7.92	7.94	8.23	8.39	7.34	7.27	7.49	7.38
Acidity	mg/L as CaCO3	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Alkalinity	mg/L as CaCO3	17	17	16	15	12	11	12	10	10	10	8
Conductivity	µS/cm	82	138	96	74	63	51	55	56	46	38	34
Sulphate	mg/L	12	32	20	12	12	9.6	9.3	13	10	5.5	5
Calcium (Ca)	mg/L	3.93	5.01	4.03	3.33	2.63	2.29	2.64	2.84	2.16	1.62	2.4
Iron (Fe)	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Silver (Ag)	mg/L	0.00003	< 0.00001	< 0.00001			0.00004					< 0.00001
Aluminum (Al)	mg/L	0.05	0.03	0.04			0.03					0.04
Arsenic (As)	mg/L	0.0180	0.0408	0.0356			0.0199					0.0013
Barium (Ba)	mg/L	0.00112	0.00196	0.00141			0.00083					0.00428
Beryllium (Be)	mg/L	0.00003	< 0.00002	< 0.00002			< 0.00002					< 0.00002
Boron (B)	mg/L	0.0057	0.0135	0.0116			0.0087					0.0008
Bismuth (Bi)	mg/L	0.00003	< 0.00001	< 0.00001			< 0.00001					< 0.00001
Cadmium (Cd)	mg/L	< 0.000003	< 0.000003	< 0.000003			< 0.000003					0.000006
Cobalt (Co)	mg/L	0.000094	0.000125	0.000051			< 0.000002					0.000231
Chromium (Cr)	mg/L	< 0.0005	< 0.0005	< 0.0005			< 0.0005					< 0.0005
Copper (Cu)	mg/L	0.0017	0.0029	0.0017			0.0021					< 0.0005
Potassium (K)	mg/L	0.79	1.64	1.56			1.13					4.67
Lithium (Li)	mg/L	0.0008	0.0014	< 0.0007			0.0025					0.0035
Magnesium (Mg)	mg/L	0.122	0.176	0.122			0.074					0.54
Manganese (Mn)	mg/L	0.00161	0.00443	0.00615			0.00426					0.0066
Molybdenum (Mo)	mg/L	0.00165	0.00478	0.00355			0.00478					0.00198
Nickel (Ni)	mg/L	0.0005	0.0011	0.0005			0.0005					0.0001
Lead (Pb)	mg/L	0.00003	< 0.00002	< 0.00002			0.00013					< 0.00002
Antimony (Sb)	mg/L	0.00057	0.00091	0.00095			0.00069					0.00036
Selenium (Se)	mg/L	0.002	0.004	0.004			0.002					< 0.001
Tin (Sn)	mg/L	0.0179	0.00627	0.00359			0.00181					0.00045
Strontium (Sr)	mg/L	0.0352	0.0524	0.0352			0.0194					0.0232
Titanium (Ti)	mg/L	0.0001	0.0001	0.0001			< 0.0001					0.0002
Thallium (Tl)	mg/L	< 0.00001	< 0.00001	< 0.00001			0.00002					< 0.000002
Uranium (U)	mg/L	0.000007	0.000008	0.000007			0.000064					0.000087
Vanadium (V)	mg/L	0.00209	0.00153	0.00132			0.00088					0.00201
Tungsten (W)	mg/L	0.00076	0.00150	0.00153			0.00098					0.00005
Yttrium (Y)	mg/L	0.000002	0.000002	0.000003			0.000003					0.000002
Zinc (Zn)	mg/L	0.001	< 0.001	0.001			0.004					0.001

Week#0 signifies the initial flooding of the humidity cell initiating the 20 week test period.

Humidity Cell Results from Sample MAR07-99

Analyte	Unit	Wk#11	Wk#12	Wk#13	Wk#14	Wk#15	Wk#16	Wk#17	Wk#18	Wk#19	Wk#20	Wk#21
		CA10163-DEC07	CA10307-DEC07	CA10483-DEC07	CA10001-JAN08	CA10088-JAN08	CA10221-JAN08	CA10366-JAN08	CA10526-JAN08	CA10012-FEB08	CA10179-FEB08	CA10305-FEB08
		11-Dec-07	19-Dec-07	24-Dec-07	02-Jan-08	08-Jan-08	16-Jan-08	22-Jan-08	29-Jan-08	05-Feb-08	12-Feb-08	19-Feb-08
Leachate Volume Added	mL	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Leachate Volume Recovered	mL	900	913	915	933	925	927	917	930	915	936	893
pH	-	6.96	7.02	6.96	7.09	7.28	7.03	7.12	7.07	7.13	7.07	7.18
Acidity	mg/L as CaCO3	< 2	< 2	< 2	< 2	< 2	< 2	2	< 2	< 2	4	< 2
Alkalinity	mg/L as CaCO3	8	8	7	7	8	7	7	8	6	6	6
Conductivity	µS/cm	39	27	32	34	34	37	34	35	29	29	32
Sulphate	mg/L	7.3	4.3	5.4	5.5	4.9	5.7	5.7	5.8	4.9	4.9	6.2
Calcium (Ca)	mg/L	2.29	2.29	2.1	2.86	2.96	3.07	3.14	3.37	3.11	2.98	3.48
Iron (Fe)	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Silver (Ag)	mg/L					< 0.00001					< 0.00001	
Aluminum (Al)	mg/L					0.02					0.02	
Arsenic (As)	mg/L					0.0077					0.0033	
Barium (Ba)	mg/L					0.00084					0.00075	
Beryllium (Be)	mg/L					< 0.00002					< 0.00002	
Boron (B)	mg/L					0.0027					0.0016	
Bismuth (Bi)	mg/L					< 0.00001					< 0.00001	
Cadmium (Cd)	mg/L					0.000003					< 0.000003	
Cobalt (Co)	mg/L					0.000024					0.000015	
Chromium (Cr)	mg/L					< 0.0005					< 0.0005	
Copper (Cu)	mg/L					0.0011					0.0008	
Potassium (K)	mg/L					1.12					0.89	
Lithium (Li)	mg/L					0.003					< 0.001	
Magnesium (Mg)	mg/L					0.138					0.161	
Manganese (Mn)	mg/L					0.00527					0.00402	
Molybdenum (Mo)	mg/L					0.00035					0.0004	
Nickel (Ni)	mg/L					0.0003					0.0003	
Lead (Pb)	mg/L					< 0.00002					< 0.00002	
Antimony (Sb)	mg/L					0.00018					0.00017	
Selenium (Se)	mg/L					< 0.001					< 0.001	
Tin (Sn)	mg/L					0.00021					0.00007	
Strontium (Sr)	mg/L					0.025					0.026	
Titanium (Ti)	mg/L					< 0.0001					< 0.0001	
Thallium (Tl)	mg/L					< 0.000002					< 0.000002	
Uranium (U)	mg/L					0.000004					0.000009	
Vanadium (V)	mg/L					0.00039					0.00015	
Tungsten (W)	mg/L					0.00012					0.00009	
Yttrium (Y)	mg/L					< 0.000001					< 0.000001	
Zinc (Zn)	mg/L					< 0.001					< 0.001	

Week#0 signifies the initial flooding of the humidity cell initiating the 20 week test period.

Humidity Cell Results from Sample MAR07-99

Analyte	Unit	Wk#22	Wk#23	Wk#24	Wk#25	Wk#26	Wk#27	Wk#28	Wk#29	Wk#30	Wk#31
		CA10425-FEB08	CA10014-MAR08	CA10155-MAR08	CA10275-MAR08	CA10378-MAR08	CA10017-APR08	CA10186-APR08	CA10299-APR08	CA10503-APR08	CA10616-APR08
		26-Feb-08	04-Mar-08	11-Mar-08	18-Mar-08	25-Mar-08	01-Apr-08	08-Apr-08	15-Apr-08	22-Apr-08	29-Apr-08
Leachate Volume Added	mL	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Leachate Volume Recovered	mL	920	939	941	932	909	993	953	979	879	941
pH	-	7.06	7.37	7.23	7.17	6.88	6.58	6.86	9.34	5.1	7.24
Acidity	mg/L as CaCO3	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	5	3
Alkalinity	mg/L as CaCO3	5	8	7	6	5	4	6	38	< 2	9
Conductivity	µS/cm	30	36	32	27	30	36	35	37	41	49
Sulphate	mg/L	5.2	6	5.9	5.5	5.6	6.5	6.6	7.9	8.7	5.3
Calcium (Ca)	mg/L	3.38	3.7	3.71	3.41	3.39	4.81	4.13	4.87	4.38	3.56
Iron (Fe)	mg/L	< 0.01	0.01	< 0.01	< 0.01	< 0.01	0.01	< 0.01	< 0.01	< 0.01	< 0.01
Silver (Ag)	mg/L				< 0.00001					< 0.00001	
Aluminum (Al)	mg/L				0.03					0.04	
Arsenic (As)	mg/L				0.0044					0.0037	
Barium (Ba)	mg/L				0.00102					0.00162	
Beryllium (Be)	mg/L				< 0.00002					< 0.00002	
Boron (B)	mg/L				0.0018					0.001	
Bismuth (Bi)	mg/L				< 0.00001					0.00001	
Cadmium (Cd)	mg/L				< 0.000003					< 0.000003	
Cobalt (Co)	mg/L				0.000019					0.000059	
Chromium (Cr)	mg/L				< 0.0005					< 0.0005	
Copper (Cu)	mg/L				0.001					0.0019	
Potassium (K)	mg/L				0.95					0.96	
Lithium (Li)	mg/L				0.002					< 0.001	
Magnesium (Mg)	mg/L				0.182					0.216	
Manganese (Mn)	mg/L				0.00381					0.00358	
Molybdenum (Mo)	mg/L				0.00021					0.00022	
Nickel (Ni)	mg/L				0.0003					0.0003	
Lead (Pb)	mg/L				< 0.00002					< 0.00002	
Antimony (Sb)	mg/L				0.00024					0.00028	
Selenium (Se)	mg/L				< 0.001					< 0.001	
Tin (Sn)	mg/L				0.00022					0.00038	
Strontium (Sr)	mg/L				0.0299					0.0404	
Titanium (Ti)	mg/L				0.0001					< 0.0001	
Thallium (Tl)	mg/L				0.000003					< 0.000002	
Uranium (U)	mg/L				< 0.000001					0.000006	
Vanadium (V)	mg/L				0.00031					0.00021	
Tungsten (W)	mg/L				0.00019					0.00003	
Yttrium (Y)	mg/L				< 0.000001					< 0.000001	
Zinc (Zn)	mg/L				< 0.001					< 0.001	

Week#0 signifies the initial flooding of the humidity cell initiating the 20 week test period.

Humidity Cell Results from Sample MAR07-99

Analyte	Unit	Wk#32	Wk#33	Wk#34	Wk#35	Wk#36	Wk#37	Wk#38	Wk#39	Wk#40	Wk#41	Wk#42
		CA10074-MAY08	CA10110-MAY08	CA10136-MAY08	CA10666-MAY08	CA10007-JUN08	CA10038-JUN08	CA10088-JUN08	CA10368-JUN08	CA10009-JUL08	CA10036-JUL08	CA10113-JUL08
		06-May-08	13-May-08	20-May-08	27-May-08	03-Jun-08	10-Jun-08	17-Jun-08	24-Jun-08	01-Jul-08	08-Jul-08	15-Jul-08
Leachate Volume Added	mL	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Leachate Volume Recovered	mL	894	904	911	898	922	930	968	966	956	860	897
pH	-	6.94	6.62	6.69	6.96	7.06	6.89	7.1	7	6.99	6.77	6.72
Acidity	mg/L as CaCO3	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Alkalinity	mg/L as CaCO3	5	3	5	5	6	8	9	6	6	4	6
Conductivity	µS/cm	34	28	28	64	29	26	34	33	33	37	31
Sulphate	mg/L	6.2	4.1	4.9	6.9	5.5	5.6	7.3	7.4	6.7	8.8	5.7
Calcium (Ca)	mg/L	3.81	2.91	3.41	4.01	3.41	3.67	4.69	5.06	4.51	4.54	4.15
Iron (Fe)	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Silver (Ag)	mg/L				< 0.00001					< 0.00001		
Aluminum (Al)	mg/L				0.01					< 0.01		
Arsenic (As)	mg/L				0.0037					0.0043		
Barium (Ba)	mg/L				0.00112					0.00133		
Beryllium (Be)	mg/L				< 0.00002					< 0.00002		
Boron (B)	mg/L				0.0014					0.0013		
Bismuth (Bi)	mg/L				< 0.00001					< 0.00001		
Cadmium (Cd)	mg/L				0.000009					0.000006		
Cobalt (Co)	mg/L				0.000051					0.000032		
Chromium (Cr)	mg/L				< 0.0005					< 0.0005		
Copper (Cu)	mg/L				0.0015					0.0012		
Potassium (K)	mg/L				0.92					0.89		
Lithium (Li)	mg/L				0.002					0.001		
Magnesium (Mg)	mg/L				0.216					0.228		
Manganese (Mn)	mg/L				0.00349					0.00476		
Molybdenum (Mo)	mg/L				0.00013					0.00019		
Nickel (Ni)	mg/L				0.0002					0.0005		
Lead (Pb)	mg/L				0.00004					< 0.00002		
Antimony (Sb)	mg/L				0.00017					0.0004		
Selenium (Se)	mg/L				< 0.001					< 0.001		
Tin (Sn)	mg/L				0.00016					0.00015		
Strontium (Sr)	mg/L				0.0348					0.0385		
Titanium (Ti)	mg/L				0.0001					< 0.0001		
Thallium (Tl)	mg/L				0.000017					0.000003		
Uranium (U)	mg/L				0.000003					0.000012		
Vanadium (V)	mg/L				0.00021					0.00021		
Tungsten (W)	mg/L				< 0.00003					0.00007		
Yttrium (Y)	mg/L				0.000001					0.000003		
Zinc (Zn)	mg/L				< 0.001					< 0.001		

Week#0 signifies the initial flooding of the humidity cell initiating the 20 week test period.

Humidity Cell Results from Sample MAR07-99

Analyte	Unit	Wk#43	Wk#44	Wk#45	Wk#46	Wk#47	Wk#48	Wk #49	Wk #50	Wk #51	Wk #52	Wk #53
		CA10139-JUL08	CA10444-JUL08	CA10009-AUG08	CA10035-AUG08	CA10417-AUG08	CA10490-AUG08	CA10007-SEP08	CA10035-SEP08	CA10199-SEP08	CA10453-SEP08	CA10613-SEP08
		22-Jul-08	29-Jul-08	05-Aug-08	12-Aug-08	19-Aug-08	26-Aug-08	02-Sep-08	09-Sep-08	16-Sep-08	23-Sep-08	30-Sep-08
Leachate Volume Added	mL	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Leachate Volume Recovered	mL	915	927	908	987	882	979	944	965	955	987	969
pH	-	6.62	6.82	6.89	7.34	6.94	6.85	6.91	7.1	6.88	7.1	7.04
Acidity	mg/L as CaCO3	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Alkalinity	mg/L as CaCO3	5	5	6	10	6	6	6	8	7	9	8
Conductivity	µS/cm	25	28	32	59	40	28	31	32	36	38	34
Sulphate	mg/L	4.6	5.4	6.5	8.7	5.7	5.1	5.5	6.6	7	7.6	6.6
Calcium (Ca)	mg/L	3.16	3.5	4.26	6.64	4.01	3.87	4.27	5	5	5.87	5.1
Iron (Fe)	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Silver (Ag)	mg/L			< 0.00001					0.00001			
Aluminum (Al)	mg/L			0.02					0.02			
Arsenic (As)	mg/L			0.004					0.0041			
Barium (Ba)	mg/L			0.0012					0.00145			
Beryllium (Be)	mg/L			< 0.00002					< 0.00002			
Boron (B)	mg/L			0.0012					0.0014			
Bismuth (Bi)	mg/L			< 0.00001					< 0.00001			
Cadmium (Cd)	mg/L			< 0.000003					< 0.000003			
Cobalt (Co)	mg/L			0.000039					0.000036			
Chromium (Cr)	mg/L			< 0.0005					< 0.0005			
Copper (Cu)	mg/L			0.0015					0.0011			
Potassium (K)	mg/L			0.83					0.89			
Lithium (Li)	mg/L			< 0.001					0.002			
Magnesium (Mg)	mg/L			0.213					0.246			
Manganese (Mn)	mg/L			0.00442					0.00523			
Molybdenum (Mo)	mg/L			0.0001					0.00014			
Nickel (Ni)	mg/L			0.0004					0.0004			
Lead (Pb)	mg/L			< 0.00002					< 0.00002			
Antimony (Sb)	mg/L			0.00028					0.00024			
Selenium (Se)	mg/L			< 0.001					< 0.001			
Tin (Sn)	mg/L			0.00014					0.00007			
Strontium (Sr)	mg/L			0.036					0.0403			
Titanium (Ti)	mg/L			< 0.0001					< 0.0001			
Thallium (Tl)	mg/L			0.000006					< 0.000002			
Uranium (U)	mg/L			0.000011					0.000007			
Vanadium (V)	mg/L			0.00024					0.00023			
Tungsten (W)	mg/L			0.00008					0.00005			
Yttrium (Y)	mg/L			0.000001					0.000001			
Zinc (Zn)	mg/L			< 0.001					< 0.001			

Week#0 signifies the initial flooding of the humidity cell initiating the 20 week test period.

Humidity Cell Results from Sample MAR07-99

Analyte	Unit	Wk #54	Wk #55	Wk #56	Wk #57	Wk#58	Wk#59	Wk#60	Wk#61	Wk#62	Wk#63	Wk#64
		CA10093-OCT08	CA10259-OCT08	CA10456-OCT08	CA10647-OCT08	CA10006-NOV08	CA10046-NOV08	CA10232-NOV08	CA10409-NOV08	CA10012-DEC08	CA10041-DEC08	CA10126-DEC08
		07-Oct-08	14-Oct-08	21-Oct-08	28-Oct-08	04-Nov-08	11-Nov-08	18-Nov-08	25-Nov-08	02-Dec-08	09-Dec-08	16-Dec-08
Leachate Volume Added	mL	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Leachate Volume Recovered	mL	957	977	927	942	984	980	926	948	932	993	979
pH	-	7.11	7.14	6.96	7.34	7.48	7.07	8.49	6.85	7	7.08	7.03
Acidity	mg/L as CaCO3	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Alkalinity	mg/L as CaCO3	8	8	13	12	12	9	10	6	7	7	8
Conductivity	µS/cm	35	33	30	55	47	31	32	24	30	34	32
Sulphate	mg/L	6.2	5.9	6.3	8.7	5.9	5.1	3.9	4.6	5.4	5.7	6
Calcium (Ca)	mg/L	5.33	5.27	5.06	7.12	6.18	5.22	3.53	3.99	4.34	5.2	5.51
Iron (Fe)	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Silver (Ag)	mg/L		< 0.00001					0.00002				
Aluminum (Al)	mg/L		< 0.01					0.02				
Arsenic (As)	mg/L		0.0031					0.0027				
Barium (Ba)	mg/L		0.00184					0.00102				
Beryllium (Be)	mg/L		< 0.00002					< 0.00002				
Boron (B)	mg/L		0.0007					0.0005				
Bismuth (Bi)	mg/L		< 0.00001					< 0.00001				
Cadmium (Cd)	mg/L		< 0.000003					< 0.000003				
Cobalt (Co)	mg/L		0.000049					0.000036				
Chromium (Cr)	mg/L		< 0.0005					< 0.0005				
Copper (Cu)	mg/L		0.0014					0.0015				
Potassium (K)	mg/L		0.81					0.65				
Lithium (Li)	mg/L		< 0.001					< 0.001				
Magnesium (Mg)	mg/L		0.252					0.157				
Manganese (Mn)	mg/L		0.00579					0.00369				
Molybdenum (Mo)	mg/L		0.00013					0.00006				
Nickel (Ni)	mg/L		0.0011					0.0003				
Lead (Pb)	mg/L		< 0.00002					< 0.00002				
Antimony (Sb)	mg/L		0.00027					< 0.0002				
Selenium (Se)	mg/L		< 0.001					< 0.001				
Tin (Sn)	mg/L		0.00014					0.00013				
Strontium (Sr)	mg/L		0.0438					0.0264				
Titanium (Ti)	mg/L		< 0.0001					< 0.0001				
Thallium (Tl)	mg/L		< 0.000002					0.000003				
Uranium (U)	mg/L		0.000018					0.000042				
Vanadium (V)	mg/L		0.00017					0.00016				
Tungsten (W)	mg/L		0.00008					0.00005				
Yttrium (Y)	mg/L		< 0.000001					< 0.000001				
Zinc (Zn)	mg/L		< 0.001					< 0.001				

Week#0 signifies the initial flooding of the humidity cell initiating the 20 week test period.

Humidity Cell Results from Sample MAR07-99

Analyte	Unit	Wk#65	Wk#66	Wk#67	Wk#68	Wk#69	Wk#70
		CA10269-DEC08	CA10504-DEC08	CA10012-JAN09	CA10043-JAN09	CA10135-JAN-09	CA10182-JAN-09
		23-Dec-08	29-Dec-08	06-Jan-09	13-Jan-09	20-Jan-09	27-Jan-09
Leachate Volume Added	mL	1000	1000	1000	1000	1000	1000
Leachate Volume Recovered	mL	971	961	923	982	941	926
pH	-	7.11	7.05	7.02	7.36	7.34	7.11
Acidity	mg/L as CaCO3	< 2	< 2	< 2	< 2	< 2	< 2
Alkalinity	mg/L as CaCO3	8	8	6	10	7	7
Conductivity	µS/cm	31	35	28	38	31	24
Sulphate	mg/L	5.8	5.9	6	6.5	5.5	4.8
Calcium (Ca)	mg/L	5.27	5.32	4.35	5.56	4.71	3.9
Iron (Fe)	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Silver (Ag)	mg/L	0.00001					0.00001
Aluminum (Al)	mg/L	0.02					0.02
Arsenic (As)	mg/L	0.0028					0.0022
Barium (Ba)	mg/L	0.00198					0.00112
Beryllium (Be)	mg/L	< 0.00002					< 0.00002
Boron (B)	mg/L	< 0.0002					0.0005
Bismuth (Bi)	mg/L	< 0.00001					< 0.00001
Cadmium (Cd)	mg/L	< 0.000003					< 0.000003
Cobalt (Co)	mg/L	0.00006					0.000039
Chromium (Cr)	mg/L	< 0.0005					< 0.0005
Copper (Cu)	mg/L	0.0018					0.0017
Potassium (K)	mg/L	0.73					0.61
Lithium (Li)	mg/L	< 0.001					< 0.001
Magnesium (Mg)	mg/L	0.223					0.168
Manganese (Mn)	mg/L	0.00613					0.00387
Molybdenum (Mo)	mg/L	< 0.00001					0.00005
Nickel (Ni)	mg/L	0.0005					0.0004
Lead (Pb)	mg/L	< 0.00002					0.00004
Antimony (Sb)	mg/L	0.0003					0.0002
Selenium (Se)	mg/L	< 0.001					< 0.001
Tin (Sn)	mg/L	0.00009					0.00021
Strontium (Sr)	mg/L	0.039					0.0279
Titanium (Ti)	mg/L	< 0.0001					< 0.0001
Thallium (Tl)	mg/L	0.000009					0.000006
Uranium (U)	mg/L	0.002716					0.000022
Vanadium (V)	mg/L	0.00016					0.00014
Tungsten (W)	mg/L	0.00003					0.00004
Yttrium (Y)	mg/L	0.000001					< 0.000001
Zinc (Zn)	mg/L	< 0.001					< 0.001

Week#0 signifies the initial flooding of the humidity cell initiating the 20 week test period.

Humidity Cell Results from Sample MAR07-80

Analyte	Unit	Wk#0	Wk#1	Wk#2	Wk#3	Wk#4	Wk#5	Wk#6	Wk#7	Wk#8	Wk#9	Wk#10
		CA10583-SEP07	CA10037-OCT07	CA10252-OCT07	CA10377-OCT07	CA10615-OCT07	CA10756-OCT07	CA10043-NOV07	CA10244-NOV07	CA10377-NOV07	CA10610-NOV07	CA10008-DEC07
		25-Sep-07	02-Oct-07	09-Oct-07	16-Oct-07	23-Oct-07	30-Oct-07	06-Nov-07	13-Nov-07	20-Nov-07	27-Nov-07	04-Dec-07
Leachate Volume Added	mL	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Leachate Volume Recovered	mL	817	949	964	924	906	890	872	878	871	NA	879
pH	-	7.74	7.80	7.58	7.02	7.48	7.30	7.34	7.16	7.14	7.14	7.05
Acidity	mg/L as CaCO3	< 2	< 2	< 2	< 2	< 2	< 2	3	< 2	< 2	< 2	< 2
Alkalinity	mg/L as CaCO3	11	12	10	8	10	7	6	6	6	6	5
Conductivity	µS/cm	47	68	59	46	51	45	35	30	29	28	26
Sulphate	mg/L	7.2	15	13	8.6	12	9.6	6.9	5.9	5	5.5	5.6
Calcium (Ca)	mg/L	3.60	3.10	2.54	2.13	1.73	1.86	1.67	2.06	1.66	1.63	1.9
Iron (Fe)	mg/L	< 0.01	0.04	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Silver (Ag)	mg/L	0.00003	< 0.00001	< 0.00001			0.00003					< 0.00001
Aluminum (Al)	mg/L	0.04	0.03	0.03			0.02					0.03
Arsenic (As)	mg/L	< 0.0002	0.0002	< 0.0002			0.0003					< 0.0002
Barium (Ba)	mg/L	0.00066	0.00097	0.00099			0.00091					0.00086
Beryllium (Be)	mg/L	< 0.00002	< 0.00002	< 0.00002			< 0.00002					< 0.00002
Boron (B)	mg/L	0.0009	0.0009	0.0007			0.0016					< 0.0002
Bismuth (Bi)	mg/L	0.00002	< 0.00001	< 0.00001			< 0.00001					< 0.00001
Cadmium (Cd)	mg/L	< 0.000003	< 0.000003	< 0.000003			< 0.000003					0.000006
Cobalt (Co)	mg/L	0.000138	0.000123	0.000047			< 0.000002					0.000028
Chromium (Cr)	mg/L	< 0.0005	< 0.0005	< 0.0005			< 0.0005					< 0.0005
Copper (Cu)	mg/L	0.0014	0.0018	0.0014			0.0026					0.0015
Potassium (K)	mg/L	0.50	1.18	1.17			1.18					0.98
Lithium (Li)	mg/L	0.0140	0.0152	0.0128			0.0106					0.0039
Magnesium (Mg)	mg/L	0.473	0.693	0.629			0.728					0.635
Manganese (Mn)	mg/L	0.00713	0.00825	0.00723			0.00405					0.00305
Molybdenum (Mo)	mg/L	0.00223	0.00894	0.00910			0.01019					0.00223
Nickel (Ni)	mg/L	0.0004	0.0003	0.0002			0.0003					0.0001
Lead (Pb)	mg/L	0.00003	< 0.00002	< 0.00002			0.00004					< 0.00002
Antimony (Sb)	mg/L	0.00077	0.00314	0.00361			0.00256					0.00066
Selenium (Se)	mg/L	< 0.001	< 0.001	< 0.001			< 0.001					< 0.001
Tin (Sn)	mg/L	0.0107	0.00648	0.00334			0.00124					0.00048
Strontium (Sr)	mg/L	0.0225	0.0244	0.0205			0.0157					0.0141
Titanium (Ti)	mg/L	< 0.0001	0.0001	0.0001			< 0.0001					< 0.0001
Thallium (Tl)	mg/L	< 0.00001	< 0.00001	< 0.00001			0.00001					< 0.000002
Uranium (U)	mg/L	0.000003	0.000004	0.000008			0.000027					0.000003
Vanadium (V)	mg/L	0.00127	0.00162	0.00145			0.00103					0.00058
Tungsten (W)	mg/L	0.00030	0.00068	0.00039			0.00023					0.00005
Yttrium (Y)	mg/L	0.000001	0.000001	< 0.000001			0.000003					< 0.000001
Zinc (Zn)	mg/L	0.001	0.001	0.001			0.003					0.001

Week#0 signifies the initial flooding of the humidity cell initiating the 20 week test period.

Humidity Cell Results from Sample MAR07-80

Analyte	Unit	Wk#11	Wk#12	Wk#13	Wk#14	Wk#15	Wk#16	Wk#17	Wk#18	Wk#19	Wk#20	Wk#21
		CA10163-DEC07	CA10307-DEC07	CA10483-DEC07	CA10001-JAN08	CA10088-JAN08	CA10221-JAN08	CA10366-JAN08	CA10526-JAN08	CA10012-FEB08	CA10179-FEB08	CA10305-FEB08
		11-Dec-07	19-Dec-07	24-Dec-07	02-Jan-08	08-Jan-08	16-Jan-08	22-Jan-08	29-Jan-08	05-Feb-08	12-Feb-08	19-Feb-08
Leachate Volume Added	mL	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Leachate Volume Recovered	mL	876	873	888	952	903	915	897	904	925	871	871
pH	-	6.71	6.63	6.89	6.72	7.17	7.5	6.17	7.12	6.94	6.87	6.93
Acidity	mg/L as CaCO3	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Alkalinity	mg/L as CaCO3	6	4	5	5	5	8	13	4	4	4	4
Conductivity	µS/cm	34	29	26	26	34	33	37	26	20	26	25
Sulphate	mg/L	6.7	6.8	5.3	3.7	6.9	5.2	6.3	4.8	3.4	5.7	4.2
Calcium (Ca)	mg/L	2.15	2.45	1.9	2.39	2.96	2.27	2.66	2.41	2	2.54	2.34
Iron (Fe)	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Silver (Ag)	mg/L					< 0.00001					0.00001	
Aluminum (Al)	mg/L					0.04					0.03	
Arsenic (As)	mg/L					< 0.0002					< 0.0002	
Barium (Ba)	mg/L					0.00093					0.00105	
Beryllium (Be)	mg/L					< 0.00002					< 0.00002	
Boron (B)	mg/L					0.0003					< 0.0002	
Bismuth (Bi)	mg/L					< 0.00001					< 0.00001	
Cadmium (Cd)	mg/L					< 0.000003					< 0.000003	
Cobalt (Co)	mg/L					0.000035					0.000028	
Chromium (Cr)	mg/L					< 0.0005					< 0.0005	
Copper (Cu)	mg/L					0.0015					0.0016	
Potassium (K)	mg/L					1.11					0.71	
Lithium (Li)	mg/L					0.003					< 0.001	
Magnesium (Mg)	mg/L					0.734					0.47	
Manganese (Mn)	mg/L					0.00362					0.00336	
Molybdenum (Mo)	mg/L					0.00179					0.00102	
Nickel (Ni)	mg/L					< 0.0001					< 0.0001	
Lead (Pb)	mg/L					< 0.00002					< 0.00002	
Antimony (Sb)	mg/L					0.00052					0.00041	
Selenium (Se)	mg/L					< 0.001					< 0.001	
Tin (Sn)	mg/L					0.00033					0.00012	
Strontium (Sr)	mg/L					0.0196					0.0165	
Titanium (Ti)	mg/L					< 0.0001					< 0.0001	
Thallium (Tl)	mg/L					< 0.000002					< 0.000002	
Uranium (U)	mg/L					0.000003					0.00003	
Vanadium (V)	mg/L					0.00054					0.0002	
Tungsten (W)	mg/L					< 0.00003					0.00006	
Yttrium (Y)	mg/L					< 0.000001					< 0.000001	
Zinc (Zn)	mg/L					< 0.001					< 0.001	

Week#0 signifies the initial flooding of the humidity cell initiating the 20 week test period.

Humidity Cell Results from Sample MAR07-80

Analyte	Unit	Wk#22	Wk#23	Wk#24	Wk#25	Wk#26	Wk#27	Wk#28	Wk#29	Wk#30	Wk#31
		CA10425-FEB08	CA10014-MAR08	CA10155-MAR08	CA10275-MAR08	CA10378-MAR08	CA10017-APR08	CA10186-APR08	CA10299-APR08	CA10503-APR08	CA10616-APR08
		26-Feb-08	04-Mar-08	11-Mar-08	18-Mar-08	25-Mar-08	01-Apr-08	08-Apr-08	15-Apr-08	22-Apr-08	29-Apr-08
Leachate Volume Added	mL	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Leachate Volume Recovered	mL	871	902	896	922	890	926	916	844	872	895
pH	-	7.04	7.47	6.98	7.10	6.93	4.42	6.48	6.28	6.23	6.8
Acidity	mg/L as CaCO3	< 2	< 2	< 2	< 2	< 2	5	< 2	2	< 2	< 2
Alkalinity	mg/L as CaCO3	4	10	4	5	4	< 2	2	< 2	2	4
Conductivity	µS/cm	43	36	20	23	20	39	20	24	24	18
Sulphate	mg/L	4.1	3.6	3.3	4.8	3.1	5.6	3	3.7	3.6	2.7
Calcium (Ca)	mg/L	2.12	4.43	2.06	2.34	1.95	2.21	1.78	2.05	2.06	1.77
Iron (Fe)	mg/L	< 0.01	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Silver (Ag)	mg/L				< 0.00001					< 0.00001	
Aluminum (Al)	mg/L				0.03					0.01	
Arsenic (As)	mg/L				< 0.0002					< 0.0002	
Barium (Ba)	mg/L				0.00109					0.00093	
Beryllium (Be)	mg/L				< 0.00002					< 0.00002	
Boron (B)	mg/L				0.0002					< 0.0002	
Bismuth (Bi)	mg/L				< 0.00001					< 0.00001	
Cadmium (Cd)	mg/L				< 0.000003					< 0.000003	
Cobalt (Co)	mg/L				0.000023					0.000064	
Chromium (Cr)	mg/L				< 0.0005					< 0.0005	
Copper (Cu)	mg/L				0.0014					0.0017	
Potassium (K)	mg/L				0.76					0.78	
Lithium (Li)	mg/L				0.002					< 0.001	
Magnesium (Mg)	mg/L				0.438					0.386	
Manganese (Mn)	mg/L				0.0037					0.00358	
Molybdenum (Mo)	mg/L				0.00068					0.00044	
Nickel (Ni)	mg/L				0.0001					< 0.0001	
Lead (Pb)	mg/L				< 0.00002					0.00004	
Antimony (Sb)	mg/L				0.00036					0.0004	
Selenium (Se)	mg/L				< 0.001					< 0.001	
Tin (Sn)	mg/L				0.00026					0.00032	
Strontium (Sr)	mg/L				0.0145					0.0131	
Titanium (Ti)	mg/L				< 0.0001					< 0.0001	
Thallium (Tl)	mg/L				< 0.000002					< 0.000002	
Uranium (U)	mg/L				< 0.000001					0.00002	
Vanadium (V)	mg/L				0.00042					0.00025	
Tungsten (W)	mg/L				0.00012					< 0.00003	
Yttrium (Y)	mg/L				< 0.000001					< 0.000001	
Zinc (Zn)	mg/L				< 0.001					< 0.001	

Week#0 signifies the initial flooding of the humidity cell initiating the 20 week test period.

Humidity Cell Results from Sample MAR07-80

Analyte	Unit	Wk#32	Wk#33	Wk#34	Wk#35	Wk#36	Wk#37	Wk#38	Wk#39	Wk#40	Wk#41	Wk#42
		CA10074-MAY08	CA10110-MAY08	CA10136-MAY08	CA10666-MAY08	CA10007-JUN08	CA10038-JUN08	CA10088-JUN08	CA10368-JUN08	CA10009-JUL08	CA10036-JUL08	CA10113-JUL08
		06-May-08	13-May-08	20-May-08	27-May-08	03-Jun-08	10-Jun-08	17-Jun-08	24-Jun-08	01-Jul-08	08-Jul-08	15-Jul-08
Leachate Volume Added	mL	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Leachate Volume Recovered	mL	867	864	876	873	864	893	980	959	938	968	865
pH	-	6.55	6.65	6.89	6.98	6.98	6.89	7.08	7.04	6.86	7.01	6.62
Acidity	mg/L as CaCO3	< 2	< 2	< 2	< 2	< 2	< 2	4	< 2	< 2	< 2	< 2
Alkalinity	mg/L as CaCO3	3	3	4	4	4	6	7	6	5	9	3
Conductivity	µS/cm	51	22	22	24	20	16	22	22	21	35	22
Sulphate	mg/L	3.4	3.4	3.0	4.0	3.5	3	4	3.6	3.6	5	4.7
Calcium (Ca)	mg/L	2.14	2.1	2.18	2.29	2.03	2.04	3.05	3.13	2.67	4.64	2.67
Iron (Fe)	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Silver (Ag)	mg/L				< 0.00001					< 0.00001		
Aluminum (Al)	mg/L				0.01					0.02		
Arsenic (As)	mg/L				< 0.0002					< 0.0002		
Barium (Ba)	mg/L				0.001					0.00115		
Beryllium (Be)	mg/L				< 0.00002					< 0.00002		
Boron (B)	mg/L				< 0.0002					< 0.0002		
Bismuth (Bi)	mg/L				< 0.00001					< 0.00001		
Cadmium (Cd)	mg/L				< 0.000003					< 0.000003		
Cobalt (Co)	mg/L				0.000034					0.000042		
Chromium (Cr)	mg/L				< 0.0005					< 0.0005		
Copper (Cu)	mg/L				0.0014					0.002		
Potassium (K)	mg/L				0.81					0.68		
Lithium (Li)	mg/L				0.002					0.001		
Magnesium (Mg)	mg/L				0.378					0.298		
Manganese (Mn)	mg/L				0.0036					0.00526		
Molybdenum (Mo)	mg/L				0.00037					0.0004		
Nickel (Ni)	mg/L				< 0.0001					0.0001		
Lead (Pb)	mg/L				< 0.00002					< 0.00002		
Antimony (Sb)	mg/L				0.00039					0.00059		
Selenium (Se)	mg/L				< 0.001					< 0.001		
Tin (Sn)	mg/L				0.00007					0.0002		
Strontium (Sr)	mg/L				0.0132					0.0158		
Titanium (Ti)	mg/L				< 0.0001					< 0.0001		
Thallium (Tl)	mg/L				0.000016					< 0.000002		
Uranium (U)	mg/L				0.000005					0.000004		
Vanadium (V)	mg/L				0.00032					0.00031		
Tungsten (W)	mg/L				< 0.00003					< 0.00003		
Yttrium (Y)	mg/L				0.000001					< 0.000001		
Zinc (Zn)	mg/L				< 0.001					0.001		

Week#0 signifies the initial flooding of the humidity cell initiating the 20 week test period.

Humidity Cell Results from Sample MAR07-80

Analyte	Unit	Wk#43	Wk#44	Wk#45	Wk#46	Wk#47	Wk#48	Wk #49	Wk #50	Wk #51	Wk #52	Wk #53
		CA10139-JUL08	CA10444-JUL08	CA10009-AUG08	CA10035-AUG08	CA10417-AUG08	CA10490-AUG08	CA10007-SEP08	CA10035-SEP08	CA10199-SEP08	CA10453-SEP08	CA10613-SEP08
		22-Jul-08	29-Jul-08	05-Aug-08	12-Aug-08	19-Aug-08	26-Aug-08	02-Sep-08	09-Sep-08	16-Sep-08	23-Sep-08	30-Sep-08
Leachate Volume Added	mL	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Leachate Volume Recovered	mL	898	894	891	879	883	918	863	867	866	863	875
pH	-	6.61	6.76	6.82	6.98	6.79	6.68	6.8	7.22	6.79	6.85	6.99
Acidity	mg/L as CaCO3	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Alkalinity	mg/L as CaCO3	5	4	4	4	4	3	4	7	4	5	4
Conductivity	µS/cm	18	18	19	21	27	15	16	18	17	16	16
Sulphate	mg/L	2.9	3	3.4	3	3.1	2.2	2.1	1.7	2.4	1.6	2.6
Calcium (Ca)	mg/L	1.99	2	2.14	1.88	2.18	1.57	1.77	2.66	1.8	1.88	1.91
Iron (Fe)	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Silver (Ag)	mg/L			< 0.00001					< 0.00001			
Aluminum (Al)	mg/L			0.02					0.06			
Arsenic (As)	mg/L			< 0.0002					< 0.0002			
Barium (Ba)	mg/L			0.00094					0.00121			
Beryllium (Be)	mg/L			< 0.00002					< 0.00002			
Boron (B)	mg/L			< 0.0002					< 0.0002			
Bismuth (Bi)	mg/L			< 0.00001					< 0.00001			
Cadmium (Cd)	mg/L			< 0.000003					< 0.000003			
Cobalt (Co)	mg/L			0.000041					0.000033			
Chromium (Cr)	mg/L			< 0.0005					< 0.0005			
Copper (Cu)	mg/L			0.002					0.0017			
Potassium (K)	mg/L			0.61					0.65			
Lithium (Li)	mg/L			< 0.001					0.001			
Magnesium (Mg)	mg/L			0.25					0.261			
Manganese (Mn)	mg/L			0.0044					0.00679			
Molybdenum (Mo)	mg/L			0.00039					0.00023			
Nickel (Ni)	mg/L			0.0002					< 0.0001			
Lead (Pb)	mg/L			< 0.00002					< 0.00002			
Antimony (Sb)	mg/L			0.00027					0.0003			
Selenium (Se)	mg/L			< 0.001					< 0.001			
Tin (Sn)	mg/L			0.00014					0.0001			
Strontium (Sr)	mg/L			0.011					0.0121			
Titanium (Ti)	mg/L			< 0.0001					0.0002			
Thallium (Tl)	mg/L			< 0.000002					< 0.000002			
Uranium (U)	mg/L			0.000007					< 0.000001			
Vanadium (V)	mg/L			0.00034					0.00039			
Tungsten (W)	mg/L			< 0.00003					< 0.00003			
Yttrium (Y)	mg/L			0.000001					0.000001			
Zinc (Zn)	mg/L			< 0.001					< 0.001			

Week#0 signifies the initial flooding of the humidity cell initiating the 20 week test period.

Humidity Cell Results from Sample MAR07-80

Analyte	Unit	Wk #54	Wk #55	Wk #56	Wk #57	Wk#58	Wk#59	Wk#60	Wk#61	Wk#62	Wk#63	Wk#64
		CA10093-OCT08	CA10259-OCT08	CA10456-OCT08	CA10647-OCT08	CA10006-NOV08	CA10046-NOV08	CA10232-NOV08	CA10409-NOV08	CA10012-DEC08	CA10041-DEC08	CA10126-DEC08
		07-Oct-08	14-Oct-08	21-Oct-08	28-Oct-08	04-Nov-08	11-Nov-08	18-Nov-08	25-Nov-08	02-Dec-08	09-Dec-08	16-Dec-08
Leachate Volume Added	mL	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Leachate Volume Recovered	mL	864	888	882	843	873	860	877	875	866	875	877
pH	-	6.99	6.88	6.9	7.05	6.90	6.90	7.17	6.86	6.92	6.99	7.06
Acidity	mg/L as CaCO3	< 2	13	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Alkalinity	mg/L as CaCO3	4	4	4	4	4	4	4	4	4	4	5
Conductivity	µS/cm	15	15	14	19	19	21	15	16	15	15	17
Sulphate	mg/L	2.1	2	2	2.2	1.8	2	2.1	2.6	2.3	2.1	2.4
Calcium (Ca)	mg/L	1.63	1.66	1.71	1.85	2.02	1.96	1.94	2.1	1.95	2.0	2.41
Iron (Fe)	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Silver (Ag)	mg/L		< 0.00001					< 0.00001				
Aluminum (Al)	mg/L		0.03					0.04				
Arsenic (As)	mg/L		< 0.0002					< 0.0002				
Barium (Ba)	mg/L		0.00088					0.00086				
Beryllium (Be)	mg/L		< 0.00002					< 0.00002				
Boron (B)	mg/L		< 0.0002					< 0.0002				
Bismuth (Bi)	mg/L		< 0.00001					< 0.00001				
Cadmium (Cd)	mg/L		< 0.000003					< 0.000003				
Cobalt (Co)	mg/L		0.000038					0.000027				
Chromium (Cr)	mg/L		< 0.0005					< 0.0005				
Copper (Cu)	mg/L		0.0016					0.0011				
Potassium (K)	mg/L		0.56					0.54				
Lithium (Li)	mg/L		< 0.001					< 0.001				
Magnesium (Mg)	mg/L		0.24					0.217				
Manganese (Mn)	mg/L		0.00335					0.00291				
Molybdenum (Mo)	mg/L		0.00022					0.0001				
Nickel (Ni)	mg/L		0.0007					0.0001				
Lead (Pb)	mg/L		< 0.00002					< 0.00002				
Antimony (Sb)	mg/L		0.00027					< 0.0002				
Selenium (Se)	mg/L		< 0.001					< 0.001				
Tin (Sn)	mg/L		0.0001					0.00006				
Strontium (Sr)	mg/L		0.0083					0.0091				
Titanium (Ti)	mg/L		< 0.0001					< 0.0001				
Thallium (Tl)	mg/L		< 0.000002					< 0.000002				
Uranium (U)	mg/L		< 0.000001					0.000022				
Vanadium (V)	mg/L		0.00027					0.00024				
Tungsten (W)	mg/L		0.00004					< 0.00003				
Yttrium (Y)	mg/L		< 0.000001					< 0.000001				
Zinc (Zn)	mg/L		< 0.001					< 0.001				

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Humidity Cell Results from Sample MAR07-80

Analyte	Unit	Wk#65	Wk#66	Wk#67	Wk#68	Wk#69	Wk#70
		CA10269-DEC08	CA10504-DEC08	CA10012-JAN09	CA10043-JAN09	CA10135-JAN-09	CA10182-JAN-09
		23-Dec-08	29-Dec-08	06-Jan-09	13-Jan-09	20-Jan-09	27-Jan-09
Leachate Volume Added	mL	1000	1000	1000	1000	1000	1000
Leachate Volume Recovered	mL	874	869	868	865	881	868
pH	-	6.95	7.07	6.88	7.1	7.16	7.1
Acidity	mg/L as CaCO3	< 2	< 2	< 2	< 2	< 2	< 2
Alkalinity	mg/L as CaCO3	4	6	4	4	4	4
Conductivity	µS/cm	12	17	15	12	15	13
Sulphate	mg/L	1.6	1.8	2.4	1.3	2.1	1.6
Calcium (Ca)	mg/L	1.76	1.97	2	1.61	1.81	1.82
Iron (Fe)	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Silver (Ag)	mg/L	< 0.00001					< 0.00001
Aluminum (Al)	mg/L	0.04					0.04
Arsenic (As)	mg/L	0.0002					0.0002
Barium (Ba)	mg/L	0.00089					0.0009
Beryllium (Be)	mg/L	< 0.00002					< 0.00002
Boron (B)	mg/L	< 0.0002					< 0.0002
Bismuth (Bi)	mg/L	< 0.00001					< 0.00001
Cadmium (Cd)	mg/L	< 0.000003					< 0.000003
Cobalt (Co)	mg/L	0.000035					0.000041
Chromium (Cr)	mg/L	< 0.0005					< 0.0005
Copper (Cu)	mg/L	0.0014					0.0014
Potassium (K)	mg/L	0.49					0.52
Lithium (Li)	mg/L	< 0.001					< 0.001
Magnesium (Mg)	mg/L	0.196					0.197
Manganese (Mn)	mg/L	0.00343					0.00315
Molybdenum (Mo)	mg/L	0.00006					0.00016
Nickel (Ni)	mg/L	0.0001					0.0001
Lead (Pb)	mg/L	< 0.00002					0.00003
Antimony (Sb)	mg/L	0.0003					0.0003
Selenium (Se)	mg/L	< 0.001					< 0.001
Tin (Sn)	mg/L	0.00004					0.00022
Strontium (Sr)	mg/L	0.0079					0.008
Titanium (Ti)	mg/L	< 0.0001					< 0.0001
Thallium (Tl)	mg/L	< 0.000002					< 0.000002
Uranium (U)	mg/L	0.000089					0.000013
Vanadium (V)	mg/L	0.0003					0.00026
Tungsten (W)	mg/L	< 0.00003					< 0.00003
Yttrium (Y)	mg/L	0.000001					< 0.000001
Zinc (Zn)	mg/L	< 0.001					< 0.001

Week#0 signifies the initial flooding of the humidity cell initiating the 20 week test period.

Humidity Cell Results from Sample MAR07-98

Analyte	Unit	Wk#0	Wk#1	Wk#2	Wk#3	Wk#4	Wk#5	Wk#6	Wk#7	Wk#8	Wk#9	Wk#10
		CA10583-SEP07	CA10037-OCT07	CA10252-OCT07	CA10377-OCT07	CA10615-OCT07	CA10756-OCT07	CA10043-NOV07	CA10244-NOV07	CA10377-NOV07	CA10610-NOV07	CA10008-DEC07
		25-Sep-07	02-Oct-07	09-Oct-07	16-Oct-07	23-Oct-07	30-Oct-07	06-Nov-07	13-Nov-07	20-Nov-07	27-Nov-07	04-Dec-07
Leachate Volume Added	mL	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Leachate Volume Recovered	mL	815	945	940	957	829	949	826	829	954	NA	853
pH	-	9.13	8.69	7.46	8.33	9.60	8.80	9.2	8.31	7.67	9.29	8.95
Acidity	mg/L as CaCO3	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Alkalinity	mg/L as CaCO3	26	27	25	22	26	24	26	26	20	23	22
Conductivity	µS/cm	64	74	67	56	66	50	51	49	42	44	40
Sulphate	mg/L	< 0.5	0.7	0.7	0.8	1.2	< 0.5	0.5	< 0.5	< 0.5	< 0.5	< 0.5
Calcium (Ca)	mg/L	2.51	3.06	2.30	2.59	1.75	2.33	1.64	1.92	1.69	1.56	1.87
Iron (Fe)	mg/L	0.03	0.03	< 0.01	< 0.01	0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.02	< 0.01
Silver (Ag)	mg/L	0.00001	< 0.00001	< 0.00001			< 0.00001					< 0.00001
Aluminum (Al)	mg/L	0.09	0.06	0.06			0.06					0.08
Arsenic (As)	mg/L	0.0020	0.0041	0.0041			0.0071					0.0049
Barium (Ba)	mg/L	0.00095	0.00125	0.00095			0.00110					0.00086
Beryllium (Be)	mg/L	< 0.00002	< 0.00002	< 0.00002			< 0.00002					< 0.00002
Boron (B)	mg/L	0.0068	0.0144	0.0114			0.0110					0.0049
Bismuth (Bi)	mg/L	< 0.00001	< 0.00001	< 0.00001			< 0.00001					< 0.00001
Cadmium (Cd)	mg/L	< 0.000003	< 0.000003	< 0.000003			< 0.000003					< 0.000003
Cobalt (Co)	mg/L	0.000036	0.000044	0.000030			< 0.000002					0.000023
Chromium (Cr)	mg/L	< 0.0005	< 0.0005	< 0.0005			< 0.0005					< 0.0005
Copper (Cu)	mg/L	0.0009	< 0.0005	< 0.0005			0.0008					< 0.0005
Potassium (K)	mg/L	1.22	1.68	1.44			1.66					1.86
Lithium (Li)	mg/L	0.0013	< 0.0007	< 0.0007			0.0018					0.001
Magnesium (Mg)	mg/L	0.070	0.062	0.027			0.056					0.041
Manganese (Mn)	mg/L	0.00163	0.00514	0.00615			0.00639					0.00434
Molybdenum (Mo)	mg/L	0.00354	0.0128	0.0103			0.00610					0.00137
Nickel (Ni)	mg/L	0.0001	< 0.0001	0.0001			0.0002					< 0.0001
Lead (Pb)	mg/L	0.00017	< 0.00002	< 0.00002			0.00008					< 0.00002
Antimony (Sb)	mg/L	0.00054	0.00086	0.00081			0.00094					0.00031
Selenium (Se)	mg/L	< 0.001	< 0.001	< 0.001			< 0.001					< 0.001
Tin (Sn)	mg/L	0.00630	0.00381	0.00215			0.00144					0.00046
Strontium (Sr)	mg/L	0.0188	0.0207	0.0146			0.0161					0.0136
Titanium (Ti)	mg/L	< 0.0001	0.0001	< 0.0001			0.0001					0.0002
Thallium (Tl)	mg/L	< 0.00001	< 0.00001	< 0.00001			0.00002					0.000003
Uranium (U)	mg/L	0.000010	0.000115	0.000265			0.000658					0.000755
Vanadium (V)	mg/L	0.00498	0.00353	0.00302			0.00342					0.00282
Tungsten (W)	mg/L	0.00058	0.00250	0.00160			0.00091					0.00038
Yttrium (Y)	mg/L	0.000005	0.000011	0.000010			0.000019					0.000011
Zinc (Zn)	mg/L	0.003	< 0.001	0.001			0.003					< 0.001

Week#0 signifies the initial flooding of the humidity cell initiating the 20 week test period.

Humidity Cell Results from Sample MAR07-98

Analyte	Unit	Wk#11	Wk#12	Wk#13	Wk#14	Wk#15	Wk#16	Wk#17	Wk#18	Wk#19	Wk#20	Wk#21
		CA10163-DEC07	CA10307-DEC07	CA10483-DEC07	CA10001-JAN08	CA10088-JAN08	CA10221-JAN08	CA10366-JAN08	CA10526-JAN08	CA10012-FEB08	CA10179-FEB08	CA10305-FEB08
		11-Dec-07	19-Dec-07	24-Dec-07	02-Jan-08	08-Jan-08	16-Jan-08	22-Jan-08	29-Jan-08	05-Feb-08	12-Feb-08	19-Feb-08
Leachate Volume Added	mL	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Leachate Volume Recovered	mL	965	889	883	803	981	874	932	912	888	891	921
pH	-	7.5	8.67	9.01	7.48	7.43	8.45	7.4	8.22	7.72	7.94	8.02
Acidity	mg/L as CaCO3	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Alkalinity	mg/L as CaCO3	23	17	16	12	15	14	12	25	12	10	12
Conductivity	µS/cm	45	32	34	26	31	30	27	28	26	24	27
Sulphate	mg/L	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Calcium (Ca)	mg/L	2.73	2.18	1.58	2.02	2.02	1.65	1.71	2.08	2	1.65	1.9
Iron (Fe)	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Silver (Ag)	mg/L					< 0.00001					< 0.00001	
Aluminum (Al)	mg/L					0.04					0.03	
Arsenic (As)	mg/L					0.0038					0.0018	
Barium (Ba)	mg/L					0.00118					0.00067	
Beryllium (Be)	mg/L					< 0.00002					< 0.00002	
Boron (B)	mg/L					0.0029					0.0011	
Bismuth (Bi)	mg/L					< 0.00001					< 0.00001	
Cadmium (Cd)	mg/L					0.000003					< 0.000003	
Cobalt (Co)	mg/L					0.000025					0.00001	
Chromium (Cr)	mg/L					< 0.0005					< 0.0005	
Copper (Cu)	mg/L					0.0057					< 0.0005	
Potassium (K)	mg/L					1.69					1.33	
Lithium (Li)	mg/L					0.002					< 0.001	
Magnesium (Mg)	mg/L					0.071					0.052	
Manganese (Mn)	mg/L					0.00478					0.00446	
Molybdenum (Mo)	mg/L					0.00055					0.00061	
Nickel (Ni)	mg/L					< 0.0001					< 0.0001	
Lead (Pb)	mg/L					0.00002					< 0.00002	
Antimony (Sb)	mg/L					0.0002					0.00033	
Selenium (Se)	mg/L					< 0.001					< 0.001	
Tin (Sn)	mg/L					0.00042					0.0001	
Strontium (Sr)	mg/L					0.0208					0.0141	
Titanium (Ti)	mg/L					< 0.0001					< 0.0001	
Thallium (Tl)	mg/L					< 0.000002					< 0.000002	
Uranium (U)	mg/L					0.000502					0.00027	
Vanadium (V)	mg/L					0.0014					0.00073	
Tungsten (W)	mg/L					0.00008					0.00009	
Yttrium (Y)	mg/L					0.000003					< 0.000001	
Zinc (Zn)	mg/L					< 0.001					< 0.001	

Week#0 signifies the initial flooding of the humidity cell initiating the 20 week test period.

Humidity Cell Results from Sample MAR07-98

Analyte	Unit	Wk#22	Wk#23	Wk#24	Wk#25	Wk#26	Wk#27	Wk#28	Wk#29	Wk#30	Wk#31
		CA10425-FEB08	CA10014-MAR08	CA10155-MAR08	CA10275-MAR08	CA10378-MAR08	CA10017-APR08	CA10186-APR08	CA10299-APR08	CA10503-APR08	CA10616-APR08
		26-Feb-08	04-Mar-08	11-Mar-08	18-Mar-08	25-Mar-08	01-Apr-08	08-Apr-08	15-Apr-08	22-Apr-08	29-Apr-08
Leachate Volume Added	mL	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Leachate Volume Recovered	mL	906	865	916	885	916	930	934	884	886	948
pH	-	7.51	7.75	7.70	7.86	7.66	6.89	7.16	7.08	6.47	7.13
Acidity	mg/L as CaCO3	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Alkalinity	mg/L as CaCO3	10	10	10	11	12	8	9	11	2	7
Conductivity	µS/cm	46	25	22	22	25	23	22	22	23	20
Sulphate	mg/L	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Calcium (Ca)	mg/L	1.91	1.59	1.92	1.83	1.68	2.47	19.8	1.87	1.8	1.87
Iron (Fe)	mg/L	< 0.01	0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.02	< 0.01	< 0.01	< 0.01
Silver (Ag)	mg/L				< 0.00001					< 0.00001	
Aluminum (Al)	mg/L				0.05					< 0.01	
Arsenic (As)	mg/L				0.003					0.0026	
Barium (Ba)	mg/L				0.00093					0.00116	
Beryllium (Be)	mg/L				< 0.00002					< 0.00002	
Boron (B)	mg/L				0.0015					0.0008	
Bismuth (Bi)	mg/L				< 0.00001					< 0.00001	
Cadmium (Cd)	mg/L				< 0.000003					< 0.000003	
Cobalt (Co)	mg/L				0.000005					0.000052	
Chromium (Cr)	mg/L				< 0.0005					< 0.0005	
Copper (Cu)	mg/L				< 0.0005					< 0.0005	
Potassium (K)	mg/L				1.56					1.48	
Lithium (Li)	mg/L				0.002					0.001	
Magnesium (Mg)	mg/L				0.064					0.068	
Manganese (Mn)	mg/L				0.00421					0.00489	
Molybdenum (Mo)	mg/L				0.00044					0.00038	
Nickel (Ni)	mg/L				< 0.0001					< 0.0001	
Lead (Pb)	mg/L				< 0.00002					< 0.00002	
Antimony (Sb)	mg/L				0.00022					0.00009	
Selenium (Se)	mg/L				< 0.001					< 0.001	
Tin (Sn)	mg/L				0.00028					0.00028	
Strontium (Sr)	mg/L				0.0167					0.0172	
Titanium (Ti)	mg/L				0.0002					< 0.0001	
Thallium (Tl)	mg/L				0.000005					0.000002	
Uranium (U)	mg/L				0.000245					0.00035	
Vanadium (V)	mg/L				0.00109					0.00076	
Tungsten (W)	mg/L				0.00015					0.00005	
Yttrium (Y)	mg/L				0.000001					0.000001	
Zinc (Zn)	mg/L				0.001					< 0.001	

Week#0 signifies the initial flooding of the humidity cell initiating the 20 week test period.

Humidity Cell Results from Sample MAR07-98

Analyte	Unit	Wk#32	Wk#33	Wk#34	Wk#35	Wk#36	Wk#37	Wk#38	Wk#39	Wk#40	Wk#41	Wk#42
		CA10074-MAY08	CA10110-MAY08	CA10136-MAY08	CA10666-MAY08	CA10007-JUN08	CA10038-JUN08	CA10088-JUN08	CA10368-JUN08	CA10009-JUL08	CA10036-JUL08	CA10113-JUL08
		06-May-08	13-May-08	20-May-08	27-May-08	03-Jun-08	10-Jun-08	17-Jun-08	24-Jun-08	01-Jul-08	08-Jul-08	15-Jul-08
Leachate Volume Added	mL	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Leachate Volume Recovered	mL	941	859	866	844	866	858	953	956	924	857	840
pH	-	7.3	6.82	6.80	7.48	7.56	7.27	7.35	7.18	6.93	7.01	6.86
Acidity	mg/L as CaCO3	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Alkalinity	mg/L as CaCO3	10	5	5	9	9	11	11	9	7	7	12
Conductivity	µS/cm	24	25	23	24	21	19	19	22	21	18	19
Sulphate	mg/L	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Calcium (Ca)	mg/L	2.21	2.05	1.71	1.95	1.83	1.96	2.34	2.88	2.32	1.88	2.23
Iron (Fe)	mg/L	< 0.01	0.01	0.01	< 0.01	< 0.01	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Silver (Ag)	mg/L				< 0.00001					< 0.00001		
Aluminum (Al)	mg/L				0.03					0.03		
Arsenic (As)	mg/L				0.0037					0.0031		
Barium (Ba)	mg/L				0.00123					0.00135		
Beryllium (Be)	mg/L				< 0.00002					< 0.00002		
Boron (B)	mg/L				0.0019					0.0009		
Bismuth (Bi)	mg/L				< 0.00001					< 0.00001		
Cadmium (Cd)	mg/L				< 0.000003					0.000004		
Cobalt (Co)	mg/L				0.000028					0.000008		
Chromium (Cr)	mg/L				< 0.0005					< 0.0005		
Copper (Cu)	mg/L				< 0.0005					< 0.0005		
Potassium (K)	mg/L				1.92					1.57		
Lithium (Li)	mg/L				0.002					0.002		
Magnesium (Mg)	mg/L				0.1					0.116		
Manganese (Mn)	mg/L				0.00354					0.00382		
Molybdenum (Mo)	mg/L				0.00032					0.00025		
Nickel (Ni)	mg/L				< 0.0001					< 0.0001		
Lead (Pb)	mg/L				< 0.00002					< 0.00002		
Antimony (Sb)	mg/L				0.00017					0.00032		
Selenium (Se)	mg/L				< 0.001					< 0.001		
Tin (Sn)	mg/L				0.00012					0.00015		
Strontium (Sr)	mg/L				0.0204					0.0238		
Titanium (Ti)	mg/L				< 0.0001					< 0.0001		
Thallium (Tl)	mg/L				0.000021					0.000004		
Uranium (U)	mg/L				0.000385					0.00029		
Vanadium (V)	mg/L				0.00098					0.00082		
Tungsten (W)	mg/L				< 0.00003					0.00003		
Yttrium (Y)	mg/L				0.000004					0.000007		
Zinc (Zn)	mg/L				< 0.001					< 0.001		

Week#0 signifies the initial flooding of the humidity cell initiating the 20 week test period.

Humidity Cell Results from Sample MAR07-98

Analyte	Unit	Wk#43	Wk#44	Wk#45	Wk#46	Wk#47	Wk#48	Wk #49	Wk #50	Wk #51	Wk #52	Wk #53
		CA10139-JUL08	CA10444-JUL08	CA10009-AUG08	CA10035-AUG08	CA10417-AUG08	CA10490-AUG08	CA10007-SEP08	CA10035-SEP08	CA10199-SEP08	CA10453-SEP08	CA10613-SEP08
		22-Jul-08	29-Jul-08	05-Aug-08	12-Aug-08	19-Aug-08	26-Aug-08	02-Sep-08	09-Sep-08	16-Sep-08	23-Sep-08	30-Sep-08
Leachate Volume Added	mL	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Leachate Volume Recovered	mL	948	857	852	890	853	898	846	848	862	841	870
pH	-	6.9	7.13	7.19	7.37	7.43	7.02	7.2	7.34	7.05	7.23	7.27
Acidity	mg/L as CaCO3	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Alkalinity	mg/L as CaCO3	9	8	8	8	8	7	9	8	8	10	8
Conductivity	µS/cm	20	19	20	22	27	17	22	16	18	18	17
Sulphate	mg/L	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Calcium (Ca)	mg/L	2.14	2.04	2.24	1.77	2.11	1.76	2.27	2.02	1.94	2.13	1.86
Iron (Fe)	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Silver (Ag)	mg/L			< 0.00001					< 0.00001			
Aluminum (Al)	mg/L			0.04					0.04			
Arsenic (As)	mg/L			0.0027					0.003			
Barium (Ba)	mg/L			0.00115					0.00113			
Beryllium (Be)	mg/L			< 0.00002					< 0.00002			
Boron (B)	mg/L			0.0008					0.0009			
Bismuth (Bi)	mg/L			< 0.00001					< 0.00001			
Cadmium (Cd)	mg/L			< 0.000003					< 0.000003			
Cobalt (Co)	mg/L			0.000017					0.000009			
Chromium (Cr)	mg/L			< 0.0005					< 0.0005			
Copper (Cu)	mg/L			< 0.0005					< 0.0005			
Potassium (K)	mg/L			1.63					1.63			
Lithium (Li)	mg/L			0.001					0.002			
Magnesium (Mg)	mg/L			0.086					0.102			
Manganese (Mn)	mg/L			0.0054					0.00339			
Molybdenum (Mo)	mg/L			0.0003					0.00026			
Nickel (Ni)	mg/L			0.0002					< 0.0001			
Lead (Pb)	mg/L			0.00004					< 0.00002			
Antimony (Sb)	mg/L			0.00015					0.00014			
Selenium (Se)	mg/L			< 0.001					< 0.001			
Tin (Sn)	mg/L			0.00019					0.00009			
Strontium (Sr)	mg/L			0.0202					0.0193			
Titanium (Ti)	mg/L			< 0.0001					< 0.0001			
Thallium (Tl)	mg/L			0.000008					< 0.000002			
Uranium (U)	mg/L			0.00035					0.000266			
Vanadium (V)	mg/L			0.00096					0.00082			
Tungsten (W)	mg/L			0.00003					< 0.00003			
Yttrium (Y)	mg/L			0.000005					0.000003			
Zinc (Zn)	mg/L			< 0.001					< 0.001			

Week#0 signifies the initial flooding of the humidity cell initiating the 20 week test period.

Humidity Cell Results from Sample MAR07-98

Analyte	Unit	Wk #54	Wk #55	Wk #56	Wk #57	Wk#58	Wk#59	Wk#60	Wk#61	Wk#62	Wk#63	Wk#64
		CA10093-OCT08	CA10259-OCT08	CA10456-OCT08	CA10647-OCT08	CA10006-NOV08	CA10046-NOV08	CA10232-NOV08	CA10409-NOV08	CA10012-DEC08	CA10041-DEC08	CA10126-DEC08
		07-Oct-08	14-Oct-08	21-Oct-08	28-Oct-08	04-Nov-08	11-Nov-08	18-Nov-08	25-Nov-08	02-Dec-08	09-Dec-08	16-Dec-08
Leachate Volume Added	mL	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Leachate Volume Recovered	mL	853	897	852	856	865	863	929	955	911	895	902
pH	-	7.34	7.21	7.17	7.31	7.09	7.14	7.39	7.02	6.98	7.18	7.14
Acidity	mg/L as CaCO3	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Alkalinity	mg/L as CaCO3	8	7	7	8	7	8	8	8	7	7	7
Conductivity	µS/cm	18	17	17	21	21	15	16	16	16	16	15
Sulphate	mg/L	< 0.5	< 0.5	0.2	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	0.2	< 0.2
Calcium (Ca)	mg/L	2.12	1.94	1.94	2.01	2.26	2.04	2.1	2.28	2.03	1.99	2.16
Iron (Fe)	mg/L	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Silver (Ag)	mg/L		< 0.00001					< 0.00001				
Aluminum (Al)	mg/L		0.02					0.04				
Arsenic (As)	mg/L		0.0023					0.0023				
Barium (Ba)	mg/L		0.00124					0.00133				
Beryllium (Be)	mg/L		< 0.00002					< 0.00002				
Boron (B)	mg/L		0.0004					0.0007				
Bismuth (Bi)	mg/L		< 0.00001					< 0.00001				
Cadmium (Cd)	mg/L		< 0.000003					< 0.000003				
Cobalt (Co)	mg/L		0.000021					0.00002				
Chromium (Cr)	mg/L		< 0.0005					< 0.0005				
Copper (Cu)	mg/L		< 0.0005					< 0.0005				
Potassium (K)	mg/L		1.57					1.47				
Lithium (Li)	mg/L		0.002					0.001				
Magnesium (Mg)	mg/L		0.112					0.117				
Manganese (Mn)	mg/L		0.00369					0.00372				
Molybdenum (Mo)	mg/L		0.0002					0.00015				
Nickel (Ni)	mg/L		0.0004					< 0.0001				
Lead (Pb)	mg/L		0.00003					< 0.00002				
Antimony (Sb)	mg/L		0.00018					< 0.0002				
Selenium (Se)	mg/L		< 0.001					< 0.001				
Tin (Sn)	mg/L		0.00007					0.0001				
Strontium (Sr)	mg/L		0.019					0.0199				
Titanium (Ti)	mg/L		< 0.0001					< 0.0001				
Thallium (Tl)	mg/L		< 0.000002					0.000007				
Uranium (U)	mg/L		0.000336					0.0003				
Vanadium (V)	mg/L		0.00066					0.00069				
Tungsten (W)	mg/L		0.00004					0.00003				
Yttrium (Y)	mg/L		< 0.000001					0.000001				
Zinc (Zn)	mg/L		< 0.001					< 0.001				

Week#0 signifies the initial flooding of the humidity cell initiating the 20 week test period.

Humidity Cell Results from Sample MAR07-98

Analyte	Unit	Wk#65	Wk#66	Wk#67	Wk#68	Wk#69	Wk#70
		CA10269-DEC08	CA10504-DEC08	CA10012-JAN09	CA10043-JAN09	CA10135-JAN-09	CA10182-JAN-09
		23-Dec-08	29-Dec-08	06-Jan-09	13-Jan-09	20-Jan-09	27-Jan-09
Leachate Volume Added	mL	1000	1000	1000	1000	1000	1000
Leachate Volume Recovered	mL	858	857	891	876	913	886
pH	-	7.36	7.59	7.07	7.56	7.41	7.47
Acidity	mg/L as CaCO3	< 2	< 2	< 2	< 2	< 2	< 2
Alkalinity	mg/L as CaCO3	8	9	7	10	7	8
Conductivity	µS/cm	17	19	17	21	17	15
Sulphate	mg/L	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Calcium (Ca)	mg/L	2.15	2.51	2.34	2.1	2.13	2.18
Iron (Fe)	mg/L	0.01	< 0.01	0.04	< 0.01	< 0.01	< 0.01
Silver (Ag)	mg/L	< 0.00001					< 0.00001
Aluminum (Al)	mg/L	0.04					0.04
Arsenic (As)	mg/L	0.0028					0.0024
Barium (Ba)	mg/L	0.00147					0.00124
Beryllium (Be)	mg/L	< 0.00002					< 0.00002
Boron (B)	mg/L	< 0.0002					0.0004
Bismuth (Bi)	mg/L	< 0.00001					< 0.00001
Cadmium (Cd)	mg/L	< 0.000003					< 0.000003
Cobalt (Co)	mg/L	0.000039					0.000027
Chromium (Cr)	mg/L	< 0.0005					< 0.0005
Copper (Cu)	mg/L	< 0.0005					< 0.0005
Potassium (K)	mg/L	1.64					1.29
Lithium (Li)	mg/L	0.002					0.002
Magnesium (Mg)	mg/L	0.15					0.121
Manganese (Mn)	mg/L	0.00342					0.00398
Molybdenum (Mo)	mg/L	0.00011					0.00015
Nickel (Ni)	mg/L	0.0001					0.0001
Lead (Pb)	mg/L	< 0.00002					0.00003
Antimony (Sb)	mg/L	< 0.0002					< 0.0002
Selenium (Se)	mg/L	< 0.001					< 0.001
Tin (Sn)	mg/L	0.00008					0.00023
Strontium (Sr)	mg/L	0.0221					0.0191
Titanium (Ti)	mg/L	0.0001					< 0.0001
Thallium (Tl)	mg/L	0.000011					0.000009
Uranium (U)	mg/L	0.002477					0.000251
Vanadium (V)	mg/L	0.00083					0.00066
Tungsten (W)	mg/L	< 0.00003					< 0.00003
Yttrium (Y)	mg/L	0.000005					0.000004
Zinc (Zn)	mg/L	< 0.001					< 0.001

Week#0 signifies the initial flooding of the humidity cell initiating the 20 week test period.

Humidity Cell Results from Sample MAR07-49

Analyte	Unit	Wk#0	Wk#1	Wk#2	Wk#3	Wk#4	Wk#5	Wk#6	Wk#7	Wk#8	Wk#9	Wk#10
		CA10583-SEP07	CA10037-OCT07	CA10252-OCT07	CA10377-OCT07	CA10615-OCT07	CA10756-OCT07	CA10043-NOV07	CA10244-NOV07	CA10377-NOV07	CA10610-NOV07	CA10008-DEC07
		25-Sep-07	02-Oct-07	09-Oct-07	16-Oct-07	23-Oct-07	30-Oct-07	06-Nov-07	13-Nov-07	20-Nov-07	27-Nov-07	04-Dec-07
Leachate Volume Added	mL	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Leachate Volume Recovered	mL	828	889	975	937	928	900	934	863	873	NA	916
pH	-	8.04	8.08	8.34	7.59	7.77	7.48	7.62	6.9	7.4	7.37	7.24
Acidity	mg/L as CaCO3	< 2	< 2	< 2	< 2	< 2	< 2	< 2	9	< 2	< 2	< 2
Alkalinity	mg/L as CaCO3	15	15	16	14	11	9	9	4	11	8	8
Conductivity	µS/cm	96	164	123	77	61	50	49	72	58	50	42
Sulphate	mg/L	24	48	32	14	12	9.8	9.5	20	11	9.8	8.1
Calcium (Ca)	mg/L	5.35	7.29	5.17	3.78	2.62	2.45	2.47	4.25	3.57	2.95	3.29
Iron (Fe)	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Silver (Ag)	mg/L	0.00003	< 0.00001	< 0.00001			< 0.00001					< 0.00001
Aluminum (Al)	mg/L	0.04	0.04	0.03			0.03					0.03
Arsenic (As)	mg/L	< 0.0002	0.0002	0.0003			0.0002					< 0.0002
Barium (Ba)	mg/L	0.00045	0.00058	0.00046			0.00025					0.00025
Beryllium (Be)	mg/L	< 0.00002	< 0.00002	< 0.00002			< 0.00002					< 0.00002
Boron (B)	mg/L	0.0029	0.0062	0.0066			0.0036					0.0022
Bismuth (Bi)	mg/L	< 0.00001	< 0.00001	< 0.00001			< 0.00001					< 0.00001
Cadmium (Cd)	mg/L	< 0.000003	< 0.000003	< 0.000003			< 0.000003					< 0.000003
Cobalt (Co)	mg/L	0.000040	0.000048	0.000021			< 0.000002					0.00002
Chromium (Cr)	mg/L	< 0.0005	< 0.0005	< 0.0005			< 0.0005					< 0.0005
Copper (Cu)	mg/L	0.0009	0.0013	0.0013			0.0021					0.0016
Potassium (K)	mg/L	0.22	0.33	0.32			0.17					0.17
Lithium (Li)	mg/L	0.0008	< 0.0007	< 0.0007			0.0018					< 0.0007
Magnesium (Mg)	mg/L	0.157	0.243	0.148			0.074					0.148
Manganese (Mn)	mg/L	0.00130	0.00401	0.00469			0.00399					0.00326
Molybdenum (Mo)	mg/L	0.00152	0.00459	0.00404			0.00170					0.00035
Nickel (Ni)	mg/L	0.0002	0.0008	0.0002			0.0003					0.0002
Lead (Pb)	mg/L	< 0.00002	< 0.00002	0.00013			0.00010					< 0.00002
Antimony (Sb)	mg/L	0.00048	0.00044	0.00055			0.00035					0.00013
Selenium (Se)	mg/L	< 0.001	0.001	0.001			< 0.001					< 0.001
Tin (Sn)	mg/L	0.00765	0.00322	0.00244			0.00094					0.00043
Strontium (Sr)	mg/L	0.0508	0.0804	0.0514			0.0207					0.0325
Titanium (Ti)	mg/L	0.0001	0.0001	0.0001			0.0001					< 0.0001
Thallium (Tl)	mg/L	< 0.00001	< 0.00001	< 0.00001			< 0.00001					< 0.000002
Uranium (U)	mg/L	0.000003	0.000023	0.000026			0.000018					0.000006
Vanadium (V)	mg/L	0.00252	0.00140	0.00142			0.00061					0.00039
Tungsten (W)	mg/L	0.00030	0.00036	0.00029			0.00015					0.00007
Yttrium (Y)	mg/L	0.000001	0.000002	0.000002			0.000002					0.000001
Zinc (Zn)	mg/L	0.001	< 0.001	0.001			0.003					0.002

Week#0 signifies the initial flooding of the humidity cell initiating the 20 week test period.

Humidity Cell Results from Sample MAR07-49

Analyte	Unit	Wk#11	Wk#12	Wk#13	Wk#14	Wk#15	Wk#16	Wk#17	Wk#18	Wk#19	Wk#20	Wk#21
		CA10163-DEC07	CA10307-DEC07	CA10483-DEC07	CA10001-JAN08	CA10088-JAN08	CA10221-JAN08	CA10366-JAN08	CA10526-JAN08	CA10012-FEB08	CA10179-FEB08	CA10305-FEB08
		11-Dec-07	19-Dec-07	24-Dec-07	02-Jan-08	08-Jan-08	16-Jan-08	22-Jan-08	29-Jan-08	05-Feb-08	12-Feb-08	19-Feb-08
Leachate Volume Added	mL	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Leachate Volume Recovered	mL	901	914	913	970	923	922	929	927	926	922	875
pH	-	6.8	6.89	6.99	6.93	7.19	7.14	7.05	7.26	7.06	6.98	7.04
Acidity	mg/L as CaCO3	< 2	< 2	4	< 2	< 2	18	< 2	< 2	3	4	6
Alkalinity	mg/L as CaCO3	8	8	7	8	8	8	7	6	6	6	5
Conductivity	µS/cm	47	36	39	60	43	42	40	41	36	36	40
Sulphate	mg/L	12	7.9	8.5	12	7.3	7.8	8.2	8.5	7.2	7.6	8.8
Calcium (Ca)	mg/L	3.51	3.83	3.35	6.81	5.06	4.51	4.7	5.12	4.94	4.49	5.56
Iron (Fe)	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Silver (Ag)	mg/L					< 0.00001					< 0.00001	
Aluminum (Al)	mg/L					0.03					0.03	
Arsenic (As)	mg/L					< 0.0002					< 0.0002	
Barium (Ba)	mg/L					0.00029					0.00019	
Beryllium (Be)	mg/L					< 0.00002					< 0.00002	
Boron (B)	mg/L					0.0018					0.0006	
Bismuth (Bi)	mg/L					< 0.00001					< 0.00001	
Cadmium (Cd)	mg/L					< 0.000003					< 0.000003	
Cobalt (Co)	mg/L					0.000025					0.000032	
Chromium (Cr)	mg/L					< 0.0005					< 0.0005	
Copper (Cu)	mg/L					0.0013					0.0014	
Potassium (K)	mg/L					0.16					0.06	
Lithium (Li)	mg/L					0.002					< 0.001	
Magnesium (Mg)	mg/L					0.254					0.278	
Manganese (Mn)	mg/L					0.00489					0.00301	
Molybdenum (Mo)	mg/L					0.00014					0.00015	
Nickel (Ni)	mg/L					< 0.0001					0.0001	
Lead (Pb)	mg/L					< 0.00002					< 0.00002	
Antimony (Sb)	mg/L					0.00012					0.0002	
Selenium (Se)	mg/L					< 0.001					< 0.001	
Tin (Sn)	mg/L					0.0003					0.00015	
Strontium (Sr)	mg/L					0.0489					0.0424	
Titanium (Ti)	mg/L					< 0.0001					< 0.0001	
Thallium (Tl)	mg/L					< 0.000002					< 0.000002	
Uranium (U)	mg/L					0.000008					0.000023	
Vanadium (V)	mg/L					0.0003					0.00008	
Tungsten (W)	mg/L					< 0.00003					< 0.00003	
Yttrium (Y)	mg/L					< 0.000001					< 0.000001	
Zinc (Zn)	mg/L					< 0.001					0.001	

Week#0 signifies the initial flooding of the humidity cell initiating the 20 week test period.

Humidity Cell Results from Sample MAR07-49

Analyte	Unit	Wk#22	Wk#23	Wk#24	Wk#25	Wk#26	Wk#27	Wk#28	Wk#29	Wk#30	Wk#31
		CA10425-FEB08	CA10014-MAR08	CA10155-MAR08	CA10275-MAR08	CA10378-MAR08	CA10017-APR08	CA10186-APR08	CA10299-APR08	CA10503-APR08	CA10616-APR08
		26-Feb-08	04-Mar-08	11-Mar-08	18-Mar-08	25-Mar-08	01-Apr-08	08-Apr-08	15-Apr-08	22-Apr-08	29-Apr-08
Leachate Volume Added	mL	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Leachate Volume Recovered	mL	916	911	917	880	887	912	935	868	863	934
pH	-	6.17	7.63	6.48	6.99	6.93	5.84	6.85	6.82	6.49	6.99
Acidity	mg/L as CaCO3	3	< 2	3	< 2	3	5	< 2	3	4	< 2
Alkalinity	mg/L as CaCO3	< 2	13	3	5	5	< 2	5	4	4	5
Conductivity	µS/cm	53	53	35	33	39	34	36	39	42	32
Sulphate	mg/L	7.3	8.3	7.3	8	9.7	6.3	7.8	7.3	8.8	6.7
Calcium (Ca)	mg/L	4.71	7.72	4.62	4.81	5.53	5.11	4.73	4.48	4.79	4.46
Iron (Fe)	mg/L	< 0.01	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Silver (Ag)	mg/L				< 0.00001					< 0.00001	
Aluminum (Al)	mg/L				0.03					0.02	
Arsenic (As)	mg/L				< 0.0002					< 0.0002	
Barium (Ba)	mg/L				0.00028					0.00038	
Beryllium (Be)	mg/L				< 0.00002					< 0.00002	
Boron (B)	mg/L				0.001					0.0006	
Bismuth (Bi)	mg/L				< 0.00001					< 0.00001	
Cadmium (Cd)	mg/L				< 0.000003					0.000003	
Cobalt (Co)	mg/L				0.00003					0.000064	
Chromium (Cr)	mg/L				< 0.0005					< 0.0005	
Copper (Cu)	mg/L				0.0019					0.0031	
Potassium (K)	mg/L				0.10					0.09	
Lithium (Li)	mg/L				0.001					< 0.001	
Magnesium (Mg)	mg/L				0.317					0.31	
Manganese (Mn)	mg/L				0.00367					0.00342	
Molybdenum (Mo)	mg/L				0.00013					0.00012	
Nickel (Ni)	mg/L				0.0002					0.0002	
Lead (Pb)	mg/L				0.00002					0.00004	
Antimony (Sb)	mg/L				0.00022					< 0.00002	
Selenium (Se)	mg/L				< 0.001					< 0.001	
Tin (Sn)	mg/L				0.00046					0.00024	
Strontium (Sr)	mg/L				0.043					0.0445	
Titanium (Ti)	mg/L				< 0.0001					< 0.0001	
Thallium (Tl)	mg/L				< 0.000002					< 0.000002	
Uranium (U)	mg/L				0.000112					0.000004	
Vanadium (V)	mg/L				0.00023					0.00015	
Tungsten (W)	mg/L				0.0001					< 0.00003	
Yttrium (Y)	mg/L				< 0.000001					< 0.000001	
Zinc (Zn)	mg/L				0.001					0.002	

Week#0 signifies the initial flooding of the humidity cell initiating the 20 week test period.

Humidity Cell Results from Sample MAR07-49

Analyte	Unit	Wk#32	Wk#33	Wk#34	Wk#35	Wk#36	Wk#37	Wk#38	Wk#39	Wk#40	Wk#41	Wk#42
		CA10074-MAY08	CA10110-MAY08	CA10136-MAY08	CA10666-MAY08	CA10007-JUN08	CA10038-JUN08	CA10088-JUN08	CA10368-JUN08	CA10009-JUL08	CA10036-JUL08	CA10113-JUL08
		06-May-08	13-May-08	20-May-08	27-May-08	03-Jun-08	10-Jun-08	17-Jun-08	24-Jun-08	01-Jul-08	08-Jul-08	15-Jul-08
Leachate Volume Added	mL	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Leachate Volume Recovered	mL	857	871	876	856	904	897	971	972	958	968	886
pH	-	6.69	6.74	7.14	7.02	7.14	7.05	7.23	7.15	7.11	7.02	6.62
Acidity	mg/L as CaCO3	5	3	< 2	2	< 2	< 2	< 2	< 2	< 2	< 2	5
Alkalinity	mg/L as CaCO3	3	4	7	5	6	8	11	8	10	14	4
Conductivity	µS/cm	44	34	44	44	36	35	62	55	46	62	28
Sulphate	mg/L	9.8	5.8	6.7	9.1	7.8	8.1	17	14	8.1	11	5.3
Calcium (Ca)	mg/L	5.69	4.36	6.08	5.78	4.92	5.46	10.0	9.99	7.2	9.65	4.17
Iron (Fe)	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.01	< 0.01
Silver (Ag)	mg/L				< 0.00001					< 0.00001		
Aluminum (Al)	mg/L				0.02					0.02		
Arsenic (As)	mg/L				< 0.0002					< 0.0002		
Barium (Ba)	mg/L				0.00033					0.00035		
Beryllium (Be)	mg/L				< 0.00002					< 0.00002		
Boron (B)	mg/L				0.0011					0.0014		
Bismuth (Bi)	mg/L				< 0.00001					< 0.00001		
Cadmium (Cd)	mg/L				0.000003					0.000005		
Cobalt (Co)	mg/L				0.000035					0.000029		
Chromium (Cr)	mg/L				< 0.0005					< 0.0005		
Copper (Cu)	mg/L				0.0023					0.0017		
Potassium (K)	mg/L				0.11					0.1		
Lithium (Li)	mg/L				< 0.001					< 0.001		
Magnesium (Mg)	mg/L				0.397					0.353		
Manganese (Mn)	mg/L				0.00338					0.00477		
Molybdenum (Mo)	mg/L				0.00008					0.0001		
Nickel (Ni)	mg/L				< 0.0001					0.0003		
Lead (Pb)	mg/L				< 0.00002					< 0.00002		
Antimony (Sb)	mg/L				0.00015					0.00023		
Selenium (Se)	mg/L				< 0.001					< 0.001		
Tin (Sn)	mg/L				0.00015					0.00021		
Strontium (Sr)	mg/L				0.0501					0.0601		
Titanium (Ti)	mg/L				< 0.0001					< 0.0001		
Thallium (Tl)	mg/L				0.000015					< 0.000002		
Uranium (U)	mg/L				0.000008					0.000014		
Vanadium (V)	mg/L				0.00024					0.00026		
Tungsten (W)	mg/L				< 0.00003					< 0.00003		
Yttrium (Y)	mg/L				0.000002					0.000001		
Zinc (Zn)	mg/L				< 0.001					< 0.001		

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Humidity Cell Results from Sample MAR07-49

Analyte	Unit	Wk#43	Wk#44	Wk#45	Wk#46	Wk#47	Wk#48	Wk #49	Wk #50	Wk #51	Wk #52	Wk #53
		CA10139-JUL08	CA10444-JUL08	CA10009-AUG08	CA10035-AUG08	CA10417-AUG08	CA10490-AUG08	CA10007-SEP08	CA10035-SEP08	CA10199-SEP08	CA10453-SEP08	CA10613-SEP08
		22-Jul-08	29-Jul-08	05-Aug-08	12-Aug-08	19-Aug-08	26-Aug-08	02-Sep-08	09-Sep-08	16-Sep-08	23-Sep-08	30-Sep-08
Leachate Volume Added	mL	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Leachate Volume Recovered	mL	905	906	912	920	851	920	895	872	849	858	889
pH	-	6.67	6.81	6.82	7.06	6.88	6.79	6.79	6.9	7.34	6.95	7.06
Acidity	mg/L as CaCO3	< 2	< 2	< 2	< 2	3	3	< 2	3	< 2	< 2	< 2
Alkalinity	mg/L as CaCO3	6	4	5	5	6	5	5	5	12	6	7
Conductivity	µS/cm	30	33	35	41	57	34	35	40	46	37	37
Sulphate	mg/L	5.3	6.9	7.5	6.7	9.6	7	7	8.6	8.3	8.6	8.4
Calcium (Ca)	mg/L	4.25	4.73	5.09	4.65	6.31	4.76	4.97	15.7	7.98	5.76	5.97
Iron (Fe)	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Silver (Ag)	mg/L			< 0.00001						< 0.00001		
Aluminum (Al)	mg/L			0.02						0.06		
Arsenic (As)	mg/L			< 0.0002						0.0002		
Barium (Ba)	mg/L			0.00028						0.0005		
Beryllium (Be)	mg/L			< 0.00002						< 0.00002		
Boron (B)	mg/L			0.0004						0.0007		
Bismuth (Bi)	mg/L			< 0.00001						< 0.00001		
Cadmium (Cd)	mg/L			< 0.000003						< 0.000003		
Cobalt (Co)	mg/L			0.000049						0.000058		
Chromium (Cr)	mg/L			< 0.0005						< 0.0005		
Copper (Cu)	mg/L			0.002						0.0033		
Potassium (K)	mg/L			0.07						0.09		
Lithium (Li)	mg/L			< 0.001						0.001		
Magnesium (Mg)	mg/L			0.274						0.429		
Manganese (Mn)	mg/L			0.00389						0.00672		
Molybdenum (Mo)	mg/L			0.00006						0.0001		
Nickel (Ni)	mg/L			0.0003						0.0005		
Lead (Pb)	mg/L			< 0.00002						< 0.00002		
Antimony (Sb)	mg/L			0.00021						0.00011		
Selenium (Se)	mg/L			< 0.001						< 0.001		
Tin (Sn)	mg/L			0.00012						0.00013		
Strontium (Sr)	mg/L			0.0391						0.0557		
Titanium (Ti)	mg/L			< 0.0001						0.0002		
Thallium (Tl)	mg/L			< 0.000002						< 0.000002		
Uranium (U)	mg/L			0.00001						0.000004		
Vanadium (V)	mg/L			0.00022						0.00028		
Tungsten (W)	mg/L			< 0.00003						< 0.00003		
Yttrium (Y)	mg/L			0.000001						0.000002		
Zinc (Zn)	mg/L			< 0.001						< 0.001		

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Humidity Cell Results from Sample MAR07-49

Analyte	Unit	Wk #54	Wk #55	Wk #56	Wk #57	Wk#58	Wk#59	Wk#60	Wk#61	Wk#62	Wk#63	Wk#64
		CA10093-OCT08	CA10259-OCT08	CA10456-OCT08	CA10647-OCT08	CA10006-NOV08	CA10046-NOV08	CA10232-NOV08	CA10409-NOV08	CA10012-DEC08	CA10041-DEC08	CA10126-DEC08
		07-Oct-08	14-Oct-08	21-Oct-08	28-Oct-08	04-Nov-08	11-Nov-08	18-Nov-08	25-Nov-08	02-Dec-08	09-Dec-08	16-Dec-08
Leachate Volume Added	mL	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Leachate Volume Recovered	mL	879	901	860	846	849	844	852	900	916	892	915
pH	-	7.08	7.03	7	7.19	7.12	7.06	7.35	7.02	7.18	7.26	7.2
Acidity	mg/L as CaCO3	< 2	< 2	< 2	4	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Alkalinity	mg/L as CaCO3	6	6	10	7	11	7	8	8	9	9	9
Conductivity	µS/cm	37	38	37	43	45	35	40	37	47	46	44
Sulphate	mg/L	7.2	6.9	8	7.8	8	7.7	8.4	7.8	9	8.2	9.5
Calcium (Ca)	mg/L	5.22	5.28	5.53	5.77	6.62	5.98	6.35	6.53	7.38	7.25	7.64
Iron (Fe)	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Silver (Ag)	mg/L		< 0.00001					< 0.00001				
Aluminum (Al)	mg/L		0.03					0.04				
Arsenic (As)	mg/L		< 0.0002					< 0.0002				
Barium (Ba)	mg/L		0.00028					0.00037				
Beryllium (Be)	mg/L		< 0.00002					< 0.00002				
Boron (B)	mg/L		0.0003					0.0005				
Bismuth (Bi)	mg/L		< 0.00001					< 0.00001				
Cadmium (Cd)	mg/L		< 0.000003					< 0.000003				
Cobalt (Co)	mg/L		0.000052					0.000043				
Chromium (Cr)	mg/L		< 0.0005					< 0.0005				
Copper (Cu)	mg/L		0.002					0.0024				
Potassium (K)	mg/L		0.06					0.08				
Lithium (Li)	mg/L		< 0.001					< 0.001				
Magnesium (Mg)	mg/L		0.356					0.366				
Manganese (Mn)	mg/L		0.00471					0.00369				
Molybdenum (Mo)	mg/L		0.00008					0.00006				
Nickel (Ni)	mg/L		0.0007					0.0003				
Lead (Pb)	mg/L		< 0.00002					< 0.00002				
Antimony (Sb)	mg/L		0.00016					< 0.0002				
Selenium (Se)	mg/L		< 0.001					< 0.001				
Tin (Sn)	mg/L		0.0001					0.00014				
Strontium (Sr)	mg/L		0.039					0.0431				
Titanium (Ti)	mg/L		< 0.0001					0.0001				
Thallium (Tl)	mg/L		< 0.000002					< 0.000002				
Uranium (U)	mg/L		0.000037					0.000053				
Vanadium (V)	mg/L		0.00017					0.00026				
Tungsten (W)	mg/L		< 0.00003					< 0.00003				
Yttrium (Y)	mg/L		< 0.000001					< 0.000001				
Zinc (Zn)	mg/L		< 0.001					0.001				

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Humidity Cell Results from Sample MAR07-49

Analyte	Unit	Wk#65	Wk#66	Wk#67	Wk#68	Wk#69	Wk#70
		CA10269-DEC08	CA10504-DEC08	CA10012-JAN09	CA10043-JAN09	CA10135-JAN-09	CA10182-JAN-09
		23-Dec-08	29-Dec-08	06-Jan-09	13-Jan-09	20-Jan-09	27-Jan-09
Leachate Volume Added	mL	1000	1000	1000	1000	1000	1000
Leachate Volume Recovered	mL	910	923	951	890	922	906
pH	-	7.31	7.38	7.43	7.56	7.53	7.49
Acidity	mg/L as CaCO3	< 2	< 2	< 2	< 2	< 2	< 2
Alkalinity	mg/L as CaCO3	9	10	12	11	10	11
Conductivity	µS/cm	40	47	69	44	48	40
Sulphate	mg/L	7.4	7.7	14	7.5	8.6	7.6
Calcium (Ca)	mg/L	6.72	7.5	11.2	7.21	7.99	7.4
Iron (Fe)	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Silver (Ag)	mg/L	< 0.00001					< 0.00001
Aluminum (Al)	mg/L	0.04					0.05
Arsenic (As)	mg/L	0.0002					0.0002
Barium (Ba)	mg/L	0.00044					0.00042
Beryllium (Be)	mg/L	< 0.00002					< 0.00002
Boron (B)	mg/L	< 0.0002					0.0005
Bismuth (Bi)	mg/L	< 0.00001					< 0.00001
Cadmium (Cd)	mg/L	< 0.000003					< 0.000003
Cobalt (Co)	mg/L	0.000055					0.000053
Chromium (Cr)	mg/L	< 0.0005					< 0.0005
Copper (Cu)	mg/L	0.002					0.002
Potassium (K)	mg/L	0.05					0.08
Lithium (Li)	mg/L	< 0.001					< 0.001
Magnesium (Mg)	mg/L	0.344					0.353
Manganese (Mn)	mg/L	0.00476					0.00495
Molybdenum (Mo)	mg/L	< 0.00001					0.00006
Nickel (Ni)	mg/L	0.0003					0.0002
Lead (Pb)	mg/L	< 0.00002					0.00004
Antimony (Sb)	mg/L	< 0.0002					0.0002
Selenium (Se)	mg/L	< 0.001					< 0.001
Tin (Sn)	mg/L	0.00013					0.00031
Strontium (Sr)	mg/L	0.0451					0.0469
Titanium (Ti)	mg/L	< 0.0001					< 0.0001
Thallium (Tl)	mg/L	< 0.000002					< 0.000002
Uranium (U)	mg/L	0.001469					0.000029
Vanadium (V)	mg/L	0.00026					0.00028
Tungsten (W)	mg/L	< 0.00003					< 0.00003
Yttrium (Y)	mg/L	0.000001					0.000001
Zinc (Zn)	mg/L	< 0.001					0.002

Week#0 signifies the initial flooding of the humidity cell initiating the 20 week test period.

Humidity Cell Results from Sample MAR07-16

Analyte	Unit	Wk#0	Wk#1	Wk#2	Wk#3	Wk#4	Wk#5	Wk#6	Wk#7	Wk#8	Wk#9	Wk#10
		CA10583-SEP07	CA10037-OCT07	CA10252-OCT07	CA10377-OCT07	CA10615-OCT07	CA10756-OCT07	CA10043-NOV07	CA10244-NOV07	CA10377-NOV07	CA10610-NOV07	CA10008-DEC07
		25-Sep-07	02-Oct-07	09-Oct-07	16-Oct-07	23-Oct-07	30-Oct-07	06-Nov-07	13-Nov-07	20-Nov-07	27-Nov-07	04-Dec-07
Leachate Volume Added	mL	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Leachate Volume Recovered	mL	704	942	960	924	885	898	906	859	860	NA	887
pH	-	7.39	7.36	7.64	6.97	7.10	7.34	7.37	7.12	7.08	7.02	6.96
Acidity	mg/L as CaCO3	< 2	< 2	4	5	11	8	6	10	8	3	5
Alkalinity	mg/L as CaCO3	11	11	9	9	5	7	7	6	6	6	5
Conductivity	µS/cm	98	145	104	85	78	58	62	69	61	51	61
Sulphate	mg/L	17	34	24	16	16	12	14	18	13	13	17
Calcium (Ca)	mg/L	7.77	11.2	7.90	7.28	6.11	5.14	5.53	8.47	6.5	5.39	8.04
Iron (Fe)	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Silver (Ag)	mg/L	0.00004	< 0.00001	< 0.00001			< 0.00001					< 0.00001
Aluminum (Al)	mg/L	0.03	0.02	0.03			0.03					0.02
Arsenic (As)	mg/L	< 0.0002	0.0004	0.0003			0.0002					< 0.0002
Barium (Ba)	mg/L	0.00058	0.00086	0.00066			0.00059					0.00064
Beryllium (Be)	mg/L	0.00007	< 0.00002	< 0.00002			< 0.00002					< 0.00002
Boron (B)	mg/L	0.0086	0.0191	0.0154			0.0106					0.0042
Bismuth (Bi)	mg/L	0.00005	< 0.00001	< 0.00001			< 0.00001					< 0.00001
Cadmium (Cd)	mg/L	< 0.000003	< 0.000003	< 0.000003			0.000495					0.000005
Cobalt (Co)	mg/L	0.000051	0.000083	0.000046			< 0.000002					0.000092
Chromium (Cr)	mg/L	< 0.0005	< 0.0005	< 0.0005			< 0.0005					< 0.0005
Copper (Cu)	mg/L	0.0006	0.0010	0.0006			0.0011					0.0017
Potassium (K)	mg/L	0.55	1.01	0.97			0.78					0.88
Lithium (Li)	mg/L	0.0020	0.0028	0.0009			0.0033					0.0024
Magnesium (Mg)	mg/L	0.292	0.581	0.427			0.282					0.419
Manganese (Mn)	mg/L	0.00833	0.0152	0.0138			0.0114					0.0159
Molybdenum (Mo)	mg/L	0.00196	0.00842	0.00658			0.00958					0.00182
Nickel (Ni)	mg/L	0.0003	0.0004	0.0003			0.0004					0.0004
Lead (Pb)	mg/L	< 0.00002	< 0.00002	0.00002			0.00029					< 0.00002
Antimony (Sb)	mg/L	0.00057	0.00062	0.00069			0.00038					0.0002
Selenium (Se)	mg/L	< 0.001	< 0.001	< 0.001			< 0.001					< 0.001
Tin (Sn)	mg/L	0.00807	0.00486	0.00292			0.00097					0.0004
Strontium (Sr)	mg/L	0.0716	0.120	0.0834			0.0477					0.069
Titanium (Ti)	mg/L	< 0.0001	< 0.0001	< 0.0001			0.0001					< 0.0001
Thallium (Tl)	mg/L	0.00001	< 0.00001	< 0.00001			0.00006					0.000002
Uranium (U)	mg/L	0.000021	0.000162	0.000161			0.000275					0.000047
Vanadium (V)	mg/L	0.00113	0.00116	0.00101			0.00066					0.00039
Tungsten (W)	mg/L	0.00021	0.00061	0.00025			0.00005					0.00004
Yttrium (Y)	mg/L	0.000003	0.000004	0.000003			0.000002					0.000001
Zinc (Zn)	mg/L	0.002	< 0.001	0.001			0.015					0.002

Week#0 signifies the initial flooding of the humidity cell initiating the 20 week test period.

Humidity Cell Results from Sample MAR07-16

Analyte	Unit	Wk#11	Wk#12	Wk#13	Wk#14	Wk#15	Wk#16	Wk#17	Wk#18	Wk#19	Wk#20
		CA10163-DEC07	CA10307-DEC07	CA10483-DEC07	CA10001-JAN08	CA10088-JAN08	CA10221-JAN08	CA10366-JAN08	CA10526-JAN08	CA10012-FEB08	CA10179-FEB08
		11/Dec/07	19/Dec/07	24/Dec/07	2/Jan/08	8/Jan/08	16-Jan-08	22-Jan-08	29-Jan-08	05-Feb-08	12-Feb-08
Leachate Volume Added	mL	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Leachate Volume Recovered	mL	861	887	888	945	905	918	912	917	925	906
pH	-	6.53	6.54	6.64	6.86	6.95	6.88	6.84	7.2	6.8	6.7
Acidity	mg/L as CaCO3	10	< 2	6	< 2	2	< 2	7	3	2	24
Alkalinity	mg/L as CaCO3	5	14	4	5	5	5	4	5	4	14
Conductivity	µS/cm	80	54	62	66	57	51	48	55	48	50
Sulphate	mg/L	23	16	22	18	14	13	13	13	13	16
Calcium (Ca)	mg/L	10.2	7.76	7.24	9.22	7.57	6.14	6	6.71	6.71	6.76
Iron (Fe)	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Silver (Ag)	mg/L					< 0.00001					< 0.00001
Aluminum (Al)	mg/L					0.04					0.03
Arsenic (As)	mg/L					0.0004					0.0002
Barium (Ba)	mg/L					0.00065					0.00061
Beryllium (Be)	mg/L					< 0.00002					< 0.00002
Boron (B)	mg/L					0.0032					0.0019
Bismuth (Bi)	mg/L					< 0.00001					< 0.00001
Cadmium (Cd)	mg/L					0.000003					0.000004
Cobalt (Co)	mg/L					0.000106					0.000205
Chromium (Cr)	mg/L					< 0.0005					< 0.0005
Copper (Cu)	mg/L					0.0016					0.0039
Potassium (K)	mg/L					0.82					0.64
Lithium (Li)	mg/L					0.003					0.001
Magnesium (Mg)	mg/L					0.353					0.323
Manganese (Mn)	mg/L					0.0181					0.0198
Molybdenum (Mo)	mg/L					0.00087					0.00104
Nickel (Ni)	mg/L					0.0004					0.0009
Lead (Pb)	mg/L					< 0.00002					< 0.00002
Antimony (Sb)	mg/L					0.00015					0.00017
Selenium (Se)	mg/L					< 0.001					< 0.001
Tin (Sn)	mg/L					0.00031					0.00012
Strontium (Sr)	mg/L					0.0554					0.0446
Titanium (Ti)	mg/L					< 0.0001					< 0.0001
Thallium (Tl)	mg/L					< 0.000002					< 0.000002
Uranium (U)	mg/L					0.000034					0.000007
Vanadium (V)	mg/L					0.00025					0.00009
Tungsten (W)	mg/L					< 0.00003					< 0.00003
Yttrium (Y)	mg/L					< 0.000001					< 0.000001
Zinc (Zn)	mg/L					0.002					0.002

Week#0 signifies the initial flooding of the humidity cell initiating the 20 week test period.

Humidity Cell Results from Sample MAR07-16

Analyte	Unit	Wk#21	Wk#22	Wk#23	Wk#24	Wk#25	Wk#26	Wk#27	Wk#28	Wk#29	Wk#30
		CA10305-FEB08	CA10425-FEB08	CA10014-MAR08	CA10155-MAR08	CA10275-MAR08	CA10378-MAR08	CA10017-APR08	CA10186-APR08	CA10299-APR08	CA10503-APR08
		19/Feb/08	26/Feb/08	4/Mar/08	11/Mar/08	18-Mar-08	25-Mar-08	01-Apr-08	08-Apr-08	15-Apr-08	22-Apr-08
Leachate Volume Added	mL	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Leachate Volume Recovered	mL	843	886	910	906	872	879	903	920	863	849
pH	-	6.6	6.56	7.31	6.9	6.91	6.74	6.24	6.73	5.71	7.30
Acidity	mg/L as CaCO3	5	< 2	< 2	< 2	< 2	2	3	3	6	< 2
Alkalinity	mg/L as CaCO3	3	< 2	8	4	6	4	2	4	< 2	5
Conductivity	µS/cm	69	46	62	46	53	51	48	49	61	55
Sulphate	mg/L	16	12	14	13	17	15	13	14	18	14
Calcium (Ca)	mg/L	10.2	6.81	9.07	6.54	8.12	7.48	7.75	6.09	7.93	6.89
Iron (Fe)	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.01
Silver (Ag)	mg/L					< 0.00001					< 0.00001
Aluminum (Al)	mg/L					0.02					0.02
Arsenic (As)	mg/L					< 0.0002					< 0.0002
Barium (Ba)	mg/L					0.00084					0.00067
Beryllium (Be)	mg/L					< 0.00002					< 0.00002
Boron (B)	mg/L					0.0023					0.0011
Bismuth (Bi)	mg/L					< 0.00001					< 0.00001
Cadmium (Cd)	mg/L					0.000003					< 0.000003
Cobalt (Co)	mg/L					0.000276					0.00013
Chromium (Cr)	mg/L					< 0.0005					< 0.0005
Copper (Cu)	mg/L					0.0035					0.0048
Potassium (K)	mg/L					0.67					0.57
Lithium (Li)	mg/L					0.003					< 0.001
Magnesium (Mg)	mg/L					0.344					0.235
Manganese (Mn)	mg/L					0.0255					0.015
Molybdenum (Mo)	mg/L					0.00028					0.00028
Nickel (Ni)	mg/L					0.0012					0.0006
Lead (Pb)	mg/L					< 0.00002					< 0.00002
Antimony (Sb)	mg/L					0.00014					0.00013
Selenium (Se)	mg/L					< 0.001					< 0.001
Tin (Sn)	mg/L					0.00054					0.00043
Strontium (Sr)	mg/L					0.049					0.0407
Titanium (Ti)	mg/L					0.0002					< 0.0001
Thallium (Tl)	mg/L					< 0.000002					< 0.000002
Uranium (U)	mg/L					0.000009					0.000023
Vanadium (V)	mg/L					0.00023					0.00009
Tungsten (W)	mg/L					0.00014					< 0.00003
Yttrium (Y)	mg/L					0.000001					0.000001
Zinc (Zn)	mg/L					0.003					0.001

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Humidity Cell Results from Sample MAR07-16

Analyte	Unit	Wk#31	Wk#32	Wk#33	Wk#34	Wk#35	Wk#36	Wk#37	Wk#38	Wk#39	Wk#40	Wk#41
		CA10616-APR08	CA10074-MAY08	CA10110-MAY08	CA10136-MAY08	CA10666-MAY08	CA10007-JUN08	CA10038-JUN08	CA10088-JUN08	CA10368-JUN08	CA10009-JUL08	CA10036-JUL08
		29-Apr-08	06-May-08	13-May-08	20-May-08	27-May-08	03-Jun-08	10/Jun/08	17/Jun/08	24/Jun/08	01-Jul-08	08-Jul-08
Leachate Volume Added	mL	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Leachate Volume Recovered	mL	900	856	841	863	852	870	855	938	926	897	965
pH	-	6.74	6.63	4.08	6.36	6.81	6.86	6.7	6.94	6.78	6.7	6.82
Acidity	mg/L as CaCO3	< 2	3	11	3	< 2	< 2	< 2	11	2	< 2	< 2
Alkalinity	mg/L as CaCO3	4	3	< 2	3	4	4	6	7	5	4	6
Conductivity	µS/cm	43	56	90	53	60	45	47	74	64	63	90
Sulphate	mg/L	13	16	14	14	18	13	15	20	22	20	28
Calcium (Ca)	mg/L	5.99	8.08	7.15	7.31	8.27	6.04	7.38	10.2	11.3	9.5	13.7
Iron (Fe)	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Silver (Ag)	mg/L					< 0.00001					< 0.00001	
Aluminum (Al)	mg/L					0.01					< 0.01	
Arsenic (As)	mg/L					0.0013					0.0007	
Barium (Ba)	mg/L					0.00087					0.00105	
Beryllium (Be)	mg/L					< 0.00002					< 0.00002	
Boron (B)	mg/L					0.0019					0.0014	
Bismuth (Bi)	mg/L					< 0.00001					< 0.00001	
Cadmium (Cd)	mg/L					< 0.000003					0.000004	
Cobalt (Co)	mg/L					0.000145					0.000171	
Chromium (Cr)	mg/L					< 0.0005					< 0.0005	
Copper (Cu)	mg/L					0.003					0.0039	
Potassium (K)	mg/L					0.62					0.58	
Lithium (Li)	mg/L					< 0.001					0.001	
Magnesium (Mg)	mg/L					0.268					0.225	
Manganese (Mn)	mg/L					0.0166					0.0253	
Molybdenum (Mo)	mg/L					0.00051					0.00061	
Nickel (Ni)	mg/L					0.0006					0.0007	
Lead (Pb)	mg/L					0.00003					0.00006	
Antimony (Sb)	mg/L					0.0004					0.00037	
Selenium (Se)	mg/L					< 0.001					< 0.001	
Tin (Sn)	mg/L					0.00025					0.00025	
Strontium (Sr)	mg/L					0.0457					0.0501	
Titanium (Ti)	mg/L					< 0.0001					< 0.0001	
Thallium (Tl)	mg/L					0.00002					0.000002	
Uranium (U)	mg/L					0.000025					0.000034	
Vanadium (V)	mg/L					0.00015					0.00009	
Tungsten (W)	mg/L					< 0.00003					< 0.00003	
Yttrium (Y)	mg/L					0.000002					0.000002	
Zinc (Zn)	mg/L					0.001					0.001	

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Humidity Cell Results from Sample MAR07-16

Analyte	Unit	Wk#42	Wk#43	Wk#44	Wk#45	Wk#46	Wk#47	Wk#48	Wk #49	Wk #50	Wk #51	Wk #52
		CA10113-JUL08	CA10139-JUL08	CA10444-JUL08	CA10009-AUG08	CA10035-AUG08	CA10417-AUG08	CA10490-AUG08	CA10007-SEP08	CA10035-SEP08	CA10199-SEP08	CA10453-SEP08
		15-Jul-08	22-Jul-08	29-Jul-08	05-Aug-08	12-Aug-08	19-Aug-08	26-Aug-08	02-Sep-08	09-Sep-08	16-Sep-08	23-Sep-08
Leachate Volume Added	mL	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Leachate Volume Recovered	mL	835	865	864	868	889	841	976	873	864	876	864
pH	-	6.39	6.47	6.61	6.62	6.8	6.72	6.48	6.55	6.87	6.53	6.67
Acidity	mg/L as CaCO3	4	3	4	2	< 2	3	5	6	< 2	4	5
Alkalinity	mg/L as CaCO3	3	3	3	3	3	4	3	3	5	3	3
Conductivity	µS/cm	60	47	44	46	55	65	43	52	36	45	47
Sulphate	mg/L	19	13	13	12	12	13	12	14	11	12	13
Calcium (Ca)	mg/L	9.28	6.87	6.53	6.58	6.09	7.08	6.3	7.71	6.96	4.49	7.3
Iron (Fe)	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Silver (Ag)	mg/L				< 0.00001					< 0.00001		
Aluminum (Al)	mg/L				0.02					0.02		
Arsenic (As)	mg/L				0.0007					0.0019		
Barium (Ba)	mg/L				0.00076					0.00078		
Beryllium (Be)	mg/L				< 0.00002					< 0.00002		
Boron (B)	mg/L				0.0009					0.001		
Bismuth (Bi)	mg/L				< 0.00001					< 0.00001		
Cadmium (Cd)	mg/L				< 0.000003					< 0.000003		
Cobalt (Co)	mg/L				0.000221					0.000167		
Chromium (Cr)	mg/L				< 0.0005					< 0.0005		
Copper (Cu)	mg/L				0.011					0.0051		
Potassium (K)	mg/L				0.49					0.57		
Lithium (Li)	mg/L				< 0.001					0.001		
Magnesium (Mg)	mg/L				0.148					0.168		
Manganese (Mn)	mg/L				0.0188					0.0177		
Molybdenum (Mo)	mg/L				0.00015					0.00026		
Nickel (Ni)	mg/L				0.001					0.0007		
Lead (Pb)	mg/L				< 0.00002					< 0.00002		
Antimony (Sb)	mg/L				0.00019					0.00035		
Selenium (Se)	mg/L				< 0.001					< 0.001		
Tin (Sn)	mg/L				0.00014					0.0002		
Strontium (Sr)	mg/L				0.0318					0.0317		
Titanium (Ti)	mg/L				< 0.0001					< 0.0001		
Thallium (Tl)	mg/L				< 0.000002					< 0.000002		
Uranium (U)	mg/L				0.000017					0.000806		
Vanadium (V)	mg/L				0.00011					0.0001		
Tungsten (W)	mg/L				< 0.00003					< 0.00003		
Yttrium (Y)	mg/L				0.000002					0.000002		
Zinc (Zn)	mg/L				0.001					0.002		

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Humidity Cell Results from Sample MAR07-16

Analyte	Unit	Wk #53	Wk #54	Wk #55	Wk #56	Wk #57	Wk#58	Wk#59	Wk#60	Wk#61	Wk#62	Wk#63
		CA10613-SEP08	CA10093-OCT08	CA10259-OCT08	CA10456-OCT08	CA10647-OCT08	CA10006-NOV08	CA10046-NOV08	CA10232-NOV08	CA10409-NOV08	CA10012-DEC08	CA10041-DEC08
		30-Sep-08	07-Oct-08	14-Oct-08	21-Oct-08	28-Oct-08	04-Nov-08	11-Nov-08	18-Nov-08	25-Nov-08	02-Dec-08	09-Dec-08
Leachate Volume Added	mL	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Leachate Volume Recovered	mL	914	867	891	865	858	868	864	866	876	881	876
pH	-	6.73	6.72	6.62	6.71	6.80	6.72	6.70	6.89	6.76	6.71	6.72
Acidity	mg/L as CaCO3	4	6	4	5	4	4	10	7	6	6	6
Alkalinity	mg/L as CaCO3	3	3	3	3	3	4	3	3	3	3	4
Conductivity	µS/cm	41	48	38	44	46	46	50	43	44	47	46
Sulphate	mg/L	13	13	10	12	11	11	14	12	14	13	12
Calcium (Ca)	mg/L	6.35	6.62	5.99	6.77	6.06	6.47	7.24	6.47	7.27	6.96	6.97
Iron (Fe)	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Silver (Ag)	mg/L			< 0.00001					< 0.00001			
Aluminum (Al)	mg/L			< 0.01					0.03			
Arsenic (As)	mg/L			0.0016					0.0006			
Barium (Ba)	mg/L			0.00079					0.00079			
Beryllium (Be)	mg/L			< 0.00002					< 0.00002			
Boron (B)	mg/L			0.0004					0.0007			
Bismuth (Bi)	mg/L			< 0.00001					< 0.00001			
Cadmium (Cd)	mg/L			< 0.000003					< 0.000003			
Cobalt (Co)	mg/L			0.000231					0.000207			
Chromium (Cr)	mg/L			< 0.0005					< 0.0005			
Copper (Cu)	mg/L			0.0074					0.0042			
Potassium (K)	mg/L			0.44					0.45			
Lithium (Li)	mg/L			< 0.001					< 0.001			
Magnesium (Mg)	mg/L			0.177					0.153			
Manganese (Mn)	mg/L			0.0187					0.0159			
Molybdenum (Mo)	mg/L			0.00024					0.00014			
Nickel (Ni)	mg/L			0.0018					0.001			
Lead (Pb)	mg/L			< 0.00002					< 0.00002			
Antimony (Sb)	mg/L			0.0003					< 0.0002			
Selenium (Se)	mg/L			< 0.001					< 0.001			
Tin (Sn)	mg/L			0.00008					0.00012			
Strontium (Sr)	mg/L			0.0275					0.0261			
Titanium (Ti)	mg/L			< 0.0001					< 0.0001			
Thallium (Tl)	mg/L			< 0.000002					< 0.000002			
Uranium (U)	mg/L			0.000029					0.000061			
Vanadium (V)	mg/L			0.00006					0.00005			
Tungsten (W)	mg/L			< 0.00003					< 0.00003			
Yttrium (Y)	mg/L			< 0.000001					0.000001			
Zinc (Zn)	mg/L			0.002					0.001			

Week#0 signifies the initial flooding of the humidity cell initiating the 20 week test period.

Humidity Cell Results from Sample MAR07-16

Analyte	Unit	Wk#64	Wk#65	Wk#66	Wk#67	Wk#68	Wk#69	Wk#70	Wk#71	Wk#72	Wk#73	Wk#74
		CA10126-DEC08	CA10269-DEC08	CA10504-DEC08	CA10012-JAN09	CA10043-JAN09	CA10135-JAN-09	CA10182-JAN-09	CA10010-FEB09	CA10036-FEB09	CA10061-FEB09	CA10106-FEB09
		16-Dec-08	23-Dec-08	29-Dec-08	06-Jan-09	13-Jan-09	20-Jan-09	27-Jan-09	03-Feb-09	10-Feb-09	17-Feb-09	24-Feb-09
Leachate Volume Added	mL	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Leachate Volume Recovered	mL	906	882	882	889	873	896	866	870	862	869	866
pH	-	6.66	6.81	7.24	6.68	6.87	6.84	6.88	6.79	6.73	6.69	6.8
Acidity	mg/L as CaCO3	5	6	7	9	6	7	7	7	< 2	5	5
Alkalinity	mg/L as CaCO3	3	3	5	3	3	3	3	3	9	3	3
Conductivity	µS/cm	37	37	46	48	44	42	44	42	45	44	45
Sulphate	mg/L	10	10	11	13	13	11	13	12	12	13	13
Calcium (Ca)	mg/L	6.16	5.97	6.45	7.42	7.02	6.30	7.37	7.16	6.37	7.14	7.2
Iron (Fe)	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.02
Silver (Ag)	mg/L		< 0.00001					< 0.00001				
Aluminum (Al)	mg/L		0.03					0.02				
Arsenic (As)	mg/L		0.0009					0.0006				
Barium (Ba)	mg/L		0.00227					0.00094				
Beryllium (Be)	mg/L		< 0.00002					< 0.00002				
Boron (B)	mg/L		< 0.0002					0.0007				
Bismuth (Bi)	mg/L		< 0.00001					< 0.00001				
Cadmium (Cd)	mg/L		0.000024					< 0.000003				
Cobalt (Co)	mg/L		0.000295					0.000315				
Chromium (Cr)	mg/L		< 0.0005					< 0.0005				
Copper (Cu)	mg/L		0.0058					0.0056				
Potassium (K)	mg/L		0.43					0.47				
Lithium (Li)	mg/L		< 0.001					0.001				
Magnesium (Mg)	mg/L		0.158					0.171				
Manganese (Mn)	mg/L		0.01889					0.0214				
Molybdenum (Mo)	mg/L		< 0.00001					0.00007				
Nickel (Ni)	mg/L		0.0017					0.0013				
Lead (Pb)	mg/L		0.00002					< 0.00002				
Antimony (Sb)	mg/L		0.0014					0.0004				
Selenium (Se)	mg/L		< 0.001					< 0.001				
Tin (Sn)	mg/L		0.00035					0.00019				
Strontium (Sr)	mg/L		0.0242					0.0278				
Titanium (Ti)	mg/L		< 0.0001					< 0.0001				
Thallium (Tl)	mg/L		0.000003					0.000003				
Uranium (U)	mg/L		0.001805					0.00004				
Vanadium (V)	mg/L		0.00009					0.00008				
Tungsten (W)	mg/L		0.00014					< 0.00003				
Yttrium (Y)	mg/L		0.000002					0.000001				
Zinc (Zn)	mg/L		0.002					0.001				

Week#0 signifies the initial flooding of the humidity cell initiating the 20 week test period.

Humidity Cell Results from Sample MAR07-16

Analyte	Unit	Wk#75	Wk#76	Wk#77	Wk#78	Wk#79	Wk#80	Wk#81	Wk#82	Wk#83	Wk#84	Wk#85
		CA10045-MAR09	CA10009-MAR09	CA10057-MAR09	CA11117-MAR09	CA11275-MAR09	CA10022-APR09	CA10083-APR09	CA10058-APR09	CA11220-APR09	CA10006-MAY09	CA10025-MAY09
		03-Mar-09	10-Mar-09	17-Mar-09	24-Mar-09	31-Mar-09	07-Apr-09	14-Apr-09	21-Apr-09	28-Apr-09	05-May-09	12-May-09
Leachate Volume Added	mL	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Leachate Volume Recovered	mL	865	862	861	867	876	868	921	870	863	871	871
pH	-	6.56	6.67	6.85	6.82	6.7	6.56	6.77	6.81	6.74	6.76	6.74
Acidity	mg/L as CaCO3	6	5	4	3	5	7	6	5	6	7	6
Alkalinity	mg/L as CaCO3	3	3	3	3	3	2	3	3	3	3	3
Conductivity	µS/cm	55	46	51	54	53	60	53	50	52	57	45
Sulphate	mg/L	18	14	14	15	17	17	16	14	15	17	13
Calcium (Ca)	mg/L	8.2	7.13	7.83	7.73	7.58	8.86	8.4	7.31	8.47	8.75	6.88
Iron (Fe)	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Silver (Ag)	mg/L	< 0.00001					0.00009					0.00006
Aluminum (Al)	mg/L	< 0.01					0.01					0.01
Arsenic (As)	mg/L	0.0003					< 0.0002					< 0.0002
Barium (Ba)	mg/L	0.00149					0.0012					0.0009
Beryllium (Be)	mg/L	< 0.00002					< 0.00002					0.00004
Boron (B)	mg/L	0.0054					0.0006					0.0007
Bismuth (Bi)	mg/L	< 0.00001					< 0.00001					0.00004
Cadmium (Cd)	mg/L	0.000003					< 0.000003					0.00003
Cobalt (Co)	mg/L	0.000364					0.000693					0.000452
Chromium (Cr)	mg/L	< 0.0005					< 0.0005					< 0.0005
Copper (Cu)	mg/L	0.0047					0.006					0.0045
Potassium (K)	mg/L	0.46					0.5					0.41
Lithium (Li)	mg/L	< 0.001					< 0.001					< 0.001
Magnesium (Mg)	mg/L	0.161					0.179					0.132
Manganese (Mn)	mg/L	0.02463					0.0326					0.0277
Molybdenum (Mo)	mg/L	0.00018					0.0001					0.00005
Nickel (Ni)	mg/L	0.0018					0.0027					0.0026
Lead (Pb)	mg/L	0.00003					< 0.00002					0.00007
Antimony (Sb)	mg/L	0.0002					< 0.0002					< 0.0002
Selenium (Se)	mg/L	< 0.001					< 0.001					< 0.001
Tin (Sn)	mg/L	0.00013					0.00013					0.00011
Strontium (Sr)	mg/L	0.0288					0.0302					0.0214
Titanium (Ti)	mg/L	< 0.0001					< 0.0001					< 0.0001
Thallium (Tl)	mg/L	0.000006					< 0.0002					< 0.0002
Uranium (U)	mg/L	0.001828					0.000344					0.00004
Vanadium (V)	mg/L	0.00007					0.00004					0.00007
Tungsten (W)	mg/L	< 0.00003					< 0.00003					< 0.00003
Yttrium (Y)	mg/L	0.000003					< 0.000001					0.000023
Zinc (Zn)	mg/L	0.002					0.003					0.001

Week#0 signifies the initial flooding of the humidity cell initiating the 20 week test period.

Humidity Cell Results from Sample MAR07-16

Analyte	Unit	Wk#86	Wk#87	Wk#88	Wk#89	Wk#90
		CA10055-MAY09	CA11098-MAY09	CA10006-JUN09	CA10024-JUN09	CA10042-JUN09
		19-May-09	26-May-09	02-Jun-09	09-Jun-09	16-Jun-09
Leachate Volume Added	mL	1000	1000	1000	1000	1000
Leachate Volume Recovered	mL	863	874	860	865	856
pH	-	6.45	6.87	6.66	6.74	6.58
Acidity	mg/L as CaCO3	5	< 2	4	4	5
Alkalinity	mg/L as CaCO3	< 2	3	2	3	3
Conductivity	µS/cm	51	49	48	53	46
Sulphate	mg/L	14	16	14	16	14
Calcium (Ca)	mg/L	7.42	8.09	7.11	8.11	7.41
Iron (Fe)	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Silver (Ag)	mg/L					< 0.00001
Aluminum (Al)	mg/L					< 0.01
Arsenic (As)	mg/L					< 0.0002
Barium (Ba)	mg/L					0.001
Beryllium (Be)	mg/L					< 0.00002
Boron (B)	mg/L					0.0029
Bismuth (Bi)	mg/L					< 0.00001
Cadmium (Cd)	mg/L					0.00005
Cobalt (Co)	mg/L					0.000386
Chromium (Cr)	mg/L					< 0.0005
Copper (Cu)	mg/L					0.0044
Potassium (K)	mg/L					0.44
Lithium (Li)	mg/L					< 0.001
Magnesium (Mg)	mg/L					0.135
Manganese (Mn)	mg/L					0.025
Molybdenum (Mo)	mg/L					0.00013
Nickel (Ni)	mg/L					0.0023
Lead (Pb)	mg/L					0.00005
Antimony (Sb)	mg/L					< 0.0002
Selenium (Se)	mg/L					< 0.001
Tin (Sn)	mg/L					0.00016
Strontium (Sr)	mg/L					0.0224
Titanium (Ti)	mg/L					< 0.0001
Thallium (Tl)	mg/L					< 0.0002
Uranium (U)	mg/L					0.000042
Vanadium (V)	mg/L					0.00008
Tungsten (W)	mg/L					< 0.00003
Yttrium (Y)	mg/L					0.000001
Zinc (Zn)	mg/L					0.003

Week#0 signifies the initial flooding of the humidity cell initiating the 20 week test period.

Humidity Cell Results from Sample MAR07-33

Analyte	Unit	Wk#0	Wk#1	Wk#2	Wk#3	Wk#4	Wk#5	Wk#6	Wk#7	Wk#8	Wk#9	Wk#10
		CA10583-SEP07	CA10037-OCT07	CA10252-OCT07	CA10377-OCT07	CA10615-OCT07	CA10756-OCT07	CA10043-NOV07	CA10244-NOV07	CA10377-NOV07	CA10610-NOV07	CA10008-DEC07
		25-Sep-07	02-Oct-07	09-Oct-07	16-Oct-07	23-Oct-07	30-Oct-07	06-Nov-07	13-Nov-07	20-Nov-07	27-Nov-07	04-Dec-07
Leachate Volume Added	mL	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Leachate Volume Recovered	mL	801	942	971	929	898	883	893	850	856	NA	865
pH	-	7.71	7.50	7.62	7.24	7.58	7.42	7.38	7.19	7.2	7.28	7.26
Acidity	mg/L as CaCO3	< 2	< 2	< 2	< 2	9	6	10	8	4	< 2	5
Alkalinity	mg/L as CaCO3	11	11	11	9	8	8	7	8	7	9	7
Conductivity	µS/cm	88	135	128	90	135	80	103	87	74	61	66
Sulphate	mg/L	14	30	31	19	37	19	29	24	20	13	16
Calcium (Ca)	mg/L	6.95	10.3	9.87	8.30	11.3	7.56	10.8	10.7	8.06	7.25	9.18
Iron (Fe)	mg/L	0.48	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Silver (Ag)	mg/L	0.00002	< 0.00001	< 0.00001			< 0.00001					< 0.00001
Aluminum (Al)	mg/L	0.03	0.05	0.03			0.03					0.03
Arsenic (As)	mg/L	< 0.0002	0.0003	0.0003			0.0003					< 0.0002
Barium (Ba)	mg/L	0.00305	0.00194	0.00218			0.00206					0.00295
Beryllium (Be)	mg/L	< 0.00002	< 0.00002	< 0.00002			< 0.00002					< 0.00002
Boron (B)	mg/L	0.0048	0.0108	0.0107			0.0077					0.0033
Bismuth (Bi)	mg/L	< 0.00001	< 0.00001	< 0.00001			< 0.00001					< 0.00001
Cadmium (Cd)	mg/L	< 0.000003	< 0.000003	< 0.000003			0.000005					< 0.000003
Cobalt (Co)	mg/L	0.000045	0.000063	0.000044			< 0.000002					0.000029
Chromium (Cr)	mg/L	< 0.0005	< 0.0005	< 0.0005			< 0.0005					< 0.0005
Copper (Cu)	mg/L	0.0011	0.0019	0.0011			0.0026					0.0025
Potassium (K)	mg/L	0.16	0.22	0.22			0.13					0.08
Lithium (Li)	mg/L	0.0019	0.0015	0.0019			0.0031					0.0017
Magnesium (Mg)	mg/L	0.173	0.395	0.411			0.343					0.408
Manganese (Mn)	mg/L	0.0128	0.0185	0.0224			0.0197					0.0164
Molybdenum (Mo)	mg/L	0.00119	0.00391	0.00411			0.00437					0.00138
Nickel (Ni)	mg/L	0.0003	0.0004	0.0003			0.0003					< 0.0001
Lead (Pb)	mg/L	0.00002	0.00010	0.00002			0.00014					< 0.00002
Antimony (Sb)	mg/L	0.00045	0.00051	0.00051			0.00038					0.00019
Selenium (Se)	mg/L	< 0.001	< 0.001	< 0.001			< 0.001					< 0.001
Tin (Sn)	mg/L	0.00757	0.00667	0.00263			0.00156					0.00041
Strontium (Sr)	mg/L	0.0481	0.0877	0.0859			0.0590					0.0712
Titanium (Ti)	mg/L	< 0.0001	< 0.0001	< 0.0001			< 0.0001					< 0.0001
Thallium (Tl)	mg/L	< 0.00001	< 0.00001	< 0.00001			0.00001					< 0.000002
Uranium (U)	mg/L	0.000012	0.000167	0.000249			0.000116					0.000085
Vanadium (V)	mg/L	0.00076	0.00080	0.00059			0.00039					0.00035
Tungsten (W)	mg/L	0.00041	0.00047	0.00031			0.00021					0.00013
Yttrium (Y)	mg/L	0.000002	0.000003	0.000002			0.000004					0.000002
Zinc (Zn)	mg/L	0.002	0.002	0.001			0.005					0.001

Week#0 signifies the initial flooding of the humidity cell initiating the 20 week test period.

Humidity Cell Results from Sample MAR07-33

Analyte	Unit	Wk#11	Wk#12	Wk#13	Wk#14	Wk#15	Wk#16	Wk#17	Wk#18	Wk#19	Wk#20	Wk#21
		CA10163-DEC07	CA10307-DEC07	CA10483-DEC07	CA10001-JAN08	CA10088-JAN08	CA10221-JAN08	CA10366-JAN08	CA10526-JAN08	CA10012-FEB08	CA10179-FEB08	CA10305-FEB08
		11-Dec-07	19-Dec-07	24-Dec-07	02-Jan-08	08-Jan-08	16-Jan-08	22-Jan-08	29-Jan-08	05-Feb-08	12-Feb-08	19-Feb-08
Leachate Volume Added	mL	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Leachate Volume Recovered	mL	862	870	878	945	884	917	897	891	914	877	855
pH	-	6.75	6.92	7	7.14	7.23	7.05	6.93	7.21	6.82	6.96	7
Acidity	mg/L as CaCO3	7	5	8	< 2	3	3	9	3	3	8	3
Alkalinity	mg/L as CaCO3	7	8	6	8	7	7	6	5	5	5	5
Conductivity	µS/cm	70	59	56	42	54	48	59	48	47	67	49
Sulphate	mg/L	17	16	13	7.3	12	9.6	15	11	11	19	11
Calcium (Ca)	mg/L	8.94	9.43	6.71	6.16	7.61	6.19	8.29	7.21	6.95	10	7.62
Iron (Fe)	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Silver (Ag)	mg/L					< 0.00001					< 0.00001	
Aluminum (Al)	mg/L					0.04					0.03	
Arsenic (As)	mg/L					< 0.0002					< 0.0002	
Barium (Ba)	mg/L					0.00262					0.00289	
Beryllium (Be)	mg/L					< 0.00002					< 0.00002	
Boron (B)	mg/L					0.002					0.0009	
Bismuth (Bi)	mg/L					< 0.00001					< 0.00001	
Cadmium (Cd)	mg/L					0.000003					< 0.000003	
Cobalt (Co)	mg/L					0.000029					0.000025	
Chromium (Cr)	mg/L					< 0.0005					< 0.0005	
Copper (Cu)	mg/L					0.0012					0.0032	
Potassium (K)	mg/L					0.04					< 0.01	
Lithium (Li)	mg/L					0.002					< 0.001	
Magnesium (Mg)	mg/L					0.292					0.375	
Manganese (Mn)	mg/L					0.0179					0.0169	
Molybdenum (Mo)	mg/L					0.00059					0.00065	
Nickel (Ni)	mg/L					< 0.0001					0.0002	
Lead (Pb)	mg/L					< 0.00002					< 0.00002	
Antimony (Sb)	mg/L					0.00012					0.00019	
Selenium (Se)	mg/L					< 0.001					< 0.001	
Tin (Sn)	mg/L					0.00027					0.00017	
Strontium (Sr)	mg/L					0.0519					0.0629	
Titanium (Ti)	mg/L					< 0.0001					< 0.0001	
Thallium (Tl)	mg/L					< 0.000002					< 0.000002	
Uranium (U)	mg/L					0.000062					0.000045	
Vanadium (V)	mg/L					0.00023					0.00008	
Tungsten (W)	mg/L					0.00005					0.00006	
Yttrium (Y)	mg/L					0.000001					< 0.000001	
Zinc (Zn)	mg/L					< 0.001					0.001	

Week#0 signifies the initial flooding of the humidity cell initiating the 20 week test period.

Humidity Cell Results from Sample MAR07-33

Analyte	Unit	Wk#22	Wk#23	Wk#24	Wk#25	Wk#26	Wk#27	Wk#28	Wk#29	Wk#30	Wk#31
		CA10425-FEB08	CA10014-MAR08	CA10155-MAR08	CA10275-MAR08	CA10378-MAR08	CA10017-APR08	CA10186-APR08	CA10299-APR08	CA10503-APR08	CA10616-APR08
		26-Feb-08	04-Mar-08	11-Mar-08	18-Mar-08	25-Mar-08	01-Apr-08	08-Apr-08	15-Apr-08	22-Apr-08	29-Apr-08
Leachate Volume Added	mL	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Leachate Volume Recovered	mL	865	890	896	880	931	922	913	855	856	903
pH	-	7.22	7.74	7.11	7.13	7.11	6.56	6.97	6.81	6.27	6.92
Acidity	mg/L as CaCO3	< 2	< 2	< 2	2	< 2	2	< 2	5	5	< 2
Alkalinity	mg/L as CaCO3	6	15	6	6	6	4	6	4	2	5
Conductivity	µS/cm	73	64	54	57	51	42	43	60	56	36
Sulphate	mg/L	13	9.1	13	16	10	7.4	9.6	15	13	8
Calcium (Ca)	mg/L	8.6	9.87	8.27	9.47	6.57	7.31	6.35	8.73	8.15	5.37
Iron (Fe)	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Silver (Ag)	mg/L				< 0.00001					< 0.00001	
Aluminum (Al)	mg/L				0.04					0.03	
Arsenic (As)	mg/L				< 0.0002					0.0003	
Barium (Ba)	mg/L				0.0034					0.0027	
Beryllium (Be)	mg/L				< 0.00002					< 0.00002	
Boron (B)	mg/L				0.0013					0.0007	
Bismuth (Bi)	mg/L				< 0.00001					< 0.00001	
Cadmium (Cd)	mg/L				0.000005					< 0.000003	
Cobalt (Co)	mg/L				0.000032					0.00007	
Chromium (Cr)	mg/L				< 0.0005					< 0.0005	
Copper (Cu)	mg/L				0.0024					0.0035	
Potassium (K)	mg/L				0.05					0.03	
Lithium (Li)	mg/L				0.002					< 0.001	
Magnesium (Mg)	mg/L				0.301					0.213	
Manganese (Mn)	mg/L				0.0207					0.0143	
Molybdenum (Mo)	mg/L				0.00044					0.00037	
Nickel (Ni)	mg/L				0.0002					< 0.0001	
Lead (Pb)	mg/L				0.00013					< 0.00002	
Antimony (Sb)	mg/L				0.00015					0.00011	
Selenium (Se)	mg/L				< 0.001					< 0.001	
Tin (Sn)	mg/L				0.00026					0.00019	
Strontium (Sr)	mg/L				0.0553					0.047	
Titanium (Ti)	mg/L				0.0001					< 0.0001	
Thallium (Tl)	mg/L				< 0.000002					< 0.000002	
Uranium (U)	mg/L				0.000027					0.000072	
Vanadium (V)	mg/L				0.00021					0.00012	
Tungsten (W)	mg/L				0.00013					0.00004	
Yttrium (Y)	mg/L				0.000001					< 0.000001	
Zinc (Zn)	mg/L				0.002					< 0.001	

Week#0 signifies the initial flooding of the humidity cell initiating the 20 week test period.

Humidity Cell Results from Sample MAR07-33

Analyte	Unit	Wk#32	Wk#33	Wk#34	Wk#35	Wk#36	Wk#37	Wk#38	Wk#39	Wk#40	Wk#41	Wk#42
		CA10074-MAY08	CA10110-MAY08	CA10136-MAY08	CA10666-MAY08	CA10007-JUN08	CA10038-JUN08	CA10088-JUN08	CA10368-JUN08	CA10009-JUL08	CA10036-JUL08	CA10113-JUL08
		06-May-08	13-May-08	20-May-08	27-May-08	03-Jun-08	10-Jun-08	17-Jun-08	24-Jun-08	01-Jul-08	08-Jul-08	15-Jul-08
Leachate Volume Added	mL	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Leachate Volume Recovered	mL	841	833	878	846	886	862	968	962	929	967	843
pH	-	6.98	6.68	7.40	7.04	7.22	6.96	7.15	7.05	7.1	7.24	6.7
Acidity	mg/L as CaCO3	< 2	4	< 2	2	< 2	< 2	< 2	< 2	< 2	< 2	5
Alkalinity	mg/L as CaCO3	17	3	10	6	7	8	9	7	9	18	8
Conductivity	µS/cm	99	64	54	53	44	47	43	43	45	77	59
Sulphate	mg/L	13	15	9.4	12	11	12	9.8	10	9.4	14	15
Calcium (Ca)	mg/L	7.45	9.24	8.25	7.88	6.69	7.9	7.18	7.97	7.11	13	9.71
Iron (Fe)	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.01	< 0.01
Silver (Ag)	mg/L				< 0.00001					< 0.00001		
Aluminum (Al)	mg/L				< 0.01					0.01		
Arsenic (As)	mg/L				0.0002					0.0002		
Barium (Ba)	mg/L				0.00282					0.00212		
Beryllium (Be)	mg/L				< 0.00002					< 0.00002		
Boron (B)	mg/L				0.0013					0.001		
Bismuth (Bi)	mg/L				< 0.00001					< 0.00001		
Cadmium (Cd)	mg/L				0.000004					0.000005		
Cobalt (Co)	mg/L				0.000043					0.000052		
Chromium (Cr)	mg/L				< 0.0005					< 0.0005		
Copper (Cu)	mg/L				0.002					0.0021		
Potassium (K)	mg/L				0.04					0.03		
Lithium (Li)	mg/L				0.001					0.001		
Magnesium (Mg)	mg/L				0.206					0.162		
Manganese (Mn)	mg/L				0.0182					0.0215		
Molybdenum (Mo)	mg/L				0.00026					0.00019		
Nickel (Ni)	mg/L				< 0.0001					0.0002		
Lead (Pb)	mg/L				< 0.00002					< 0.00002		
Antimony (Sb)	mg/L				0.00007					0.0003		
Selenium (Se)	mg/L				< 0.001					< 0.001		
Tin (Sn)	mg/L				0.00003					0.00015		
Strontium (Sr)	mg/L				0.0423					0.0335		
Titanium (Ti)	mg/L				< 0.0001					< 0.0001		
Thallium (Tl)	mg/L				0.000019					< 0.000002		
Uranium (U)	mg/L				0.000058					0.000052		
Vanadium (V)	mg/L				0.00015					0.0003		
Tungsten (W)	mg/L				< 0.00003					0.00004		
Yttrium (Y)	mg/L				0.000001					0.000001		
Zinc (Zn)	mg/L				< 0.001					0.002		

Week#0 signifies the initial flooding of the humidity cell initiating the 20 week test period.

Humidity Cell Results from Sample MAR07-33

Analyte	Unit	Wk#43	Wk#44	Wk#45	Wk#46	Wk#47	Wk#48	Wk #49	Wk #50	Wk #51	Wk #52	Wk #53
		CA10139-JUL08	CA10444-JUL08	CA10009-AUG08	CA10035-AUG08	CA10417-AUG08	CA10490-AUG08	CA10007-SEP08	CA10035-SEP08	CA10199-SEP08	CA10453-SEP08	CA10613-SEP08
		22-Jul-08	29-Jul-08	05-Aug-08	12-Aug-08	19-Aug-08	26-Aug-08	02-Sep-08	09-Sep-08	16-Sep-08	23-Sep-08	30-Sep-08
Leachate Volume Added	mL	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Leachate Volume Recovered	mL	882	883	925	851	893	886	870	858	874	858	897
pH	-	6.7	6.94	7.01	7.12	7.03	6.81	6.92	7.59	6.82	7.04	7.03
Acidity	mg/L as CaCO3	2	3	< 2	2	12	3	4	< 2	< 2	3	< 2
Alkalinity	mg/L as CaCO3	7	7	6	6	6	5	6	13	6	6	6
Conductivity	µS/cm	45	44	54	54	68	38	50	49	43	50	38
Sulphate	mg/L	9.6	9.7	12	8.4	11	8.1	11	8.1	9.2	12	8
Calcium (Ca)	mg/L	7.12	6.98	8.1	6.64	7.81	5.9	7.96	9.33	6.73	8.27	6.35
Iron (Fe)	mg/L	< 0.01	< 0.01	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Silver (Ag)	mg/L			0.00001					< 0.00001			
Aluminum (Al)	mg/L			0.03					0.06			
Arsenic (As)	mg/L			0.0003					0.0003			
Barium (Ba)	mg/L			0.00215					0.00305			
Beryllium (Be)	mg/L			< 0.00002					< 0.00002			
Boron (B)	mg/L			0.0011					0.0007			
Bismuth (Bi)	mg/L			< 0.00001					< 0.00001			
Cadmium (Cd)	mg/L			0.000009					< 0.000003			
Cobalt (Co)	mg/L			0.000168					0.000058			
Chromium (Cr)	mg/L			< 0.0005					< 0.0005			
Copper (Cu)	mg/L			0.0036					0.0025			
Potassium (K)	mg/L			0.1					0.02			
Lithium (Li)	mg/L			< 0.001					0.001			
Magnesium (Mg)	mg/L			0.202					0.157			
Manganese (Mn)	mg/L			0.0206					0.0242			
Molybdenum (Mo)	mg/L			0.00018					0.00018			
Nickel (Ni)	mg/L			0.0006					< 0.0001			
Lead (Pb)	mg/L			0.00006					< 0.00002			
Antimony (Sb)	mg/L			0.00014					0.00013			
Selenium (Se)	mg/L			< 0.001					< 0.001			
Tin (Sn)	mg/L			0.00016					0.00009			
Strontium (Sr)	mg/L			0.0366					0.0361			
Titanium (Ti)	mg/L			< 0.0001					< 0.0001			
Thallium (Tl)	mg/L			< 0.000002					< 0.000002			
Uranium (U)	mg/L			0.000046					0.000023			
Vanadium (V)	mg/L			0.02907					0.00021			
Tungsten (W)	mg/L			0.0001					< 0.00003			
Yttrium (Y)	mg/L			0.000004					0.000003			
Zinc (Zn)	mg/L			0.003					< 0.001			

Week#0 signifies the initial flooding of the humidity cell initiating the 20 week test period.

Humidity Cell Results from Sample MAR07-33

Analyte	Unit	Wk #54	Wk #55	Wk #56	Wk #57	Wk#58	Wk#59	Wk#60	Wk#61	Wk#62	Wk#63	Wk#64
		CA10093-OCT08	CA10259-OCT08	CA10456-OCT08	CA10647-OCT08	CA10006-NOV08	CA10046-NOV08	CA10232-NOV08	CA10409-NOV08	CA10012-DEC08	CA10041-DEC08	CA10126-DEC08
		07-Oct-08	14-Oct-08	21-Oct-08	28-Oct-08	04-Nov-08	11-Nov-08	18-Nov-08	25-Nov-08	02-Dec-08	09-Dec-08	16-Dec-08
Leachate Volume Added	mL	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Leachate Volume Recovered	mL	967	994	984	980	987	981	959	988	989	994	990
pH	-	7.19	7.09	7.08	7.19	7.05	7.07	7.28	6.99	7.2	7.11	7.14
Acidity	mg/L as CaCO3	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Alkalinity	mg/L as CaCO3	8	52	8	8	8	8	9	7	33	9	10
Conductivity	µS/cm	47	43	50	58	57	51	55	49	56	56	52
Sulphate	mg/L	11	9.7	11	12	12	12	13	12	12	11	11
Calcium (Ca)	mg/L	8.51	8.04	8.25	8.47	9.06	8.95	9.21	9.22	9.41	9.34	10
Iron (Fe)	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Silver (Ag)	mg/L		< 0.00001					< 0.00001				
Aluminum (Al)	mg/L		< 0.01					0.03				
Arsenic (As)	mg/L		< 0.0002					< 0.0002				
Barium (Ba)	mg/L		0.00296					0.00395				
Beryllium (Be)	mg/L		< 0.00002					< 0.00002				
Boron (B)	mg/L		0.0005					0.0007				
Bismuth (Bi)	mg/L		< 0.00001					< 0.00001				
Cadmium (Cd)	mg/L		0.00001					0.000008				
Cobalt (Co)	mg/L		0.000145					0.000144				
Chromium (Cr)	mg/L		< 0.0005					< 0.0005				
Copper (Cu)	mg/L		0.0042					0.0024				
Potassium (K)	mg/L		0.02					0.02				
Lithium (Li)	mg/L		0.001					< 0.001				
Magnesium (Mg)	mg/L		0.147					0.144				
Manganese (Mn)	mg/L		0.0328					0.0384				
Molybdenum (Mo)	mg/L		0.00014					0.00013				
Nickel (Ni)	mg/L		0.0008					0.0004				
Lead (Pb)	mg/L		< 0.00002					0.00004				
Antimony (Sb)	mg/L		0.00017					< 0.0002				
Selenium (Se)	mg/L		< 0.001					< 0.001				
Tin (Sn)	mg/L		0.00023					0.00039				
Strontium (Sr)	mg/L		0.0343					0.0354				
Titanium (Ti)	mg/L		< 0.0001					< 0.0001				
Thallium (Tl)	mg/L		< 0.000002					< 0.000002				
Uranium (U)	mg/L		0.000095					0.000148				
Vanadium (V)	mg/L		0.0001					0.0001				
Tungsten (W)	mg/L		0.00007					0.00006				
Yttrium (Y)	mg/L		< 0.000001					0.000001				
Zinc (Zn)	mg/L		0.002					0.001				

Week#0 signifies the initial flooding of the humidity cell initiating the 20 week test period.

Humidity Cell Results from Sample MAR07-33

Analyte	Unit	Wk#65	Wk#66	Wk#67	Wk#68	Wk#69	Wk#70	Wk#71	Wk#72	Wk#73	Wk#74	Wk#75
		CA10269-DEC08	CA10504-DEC08	CA10012-JAN09	CA10043-JAN09	CA10135-JAN-09	CA10182-JAN-09	CA10010-FEB09	CA10036-FEB09	CA10061-FEB09	CA10106-FEB09	CA10045-MAR09
		23-Dec-08	29-Dec-08	06-Jan-09	13-Jan-09	20-Jan-09	27-Jan-09	03-Feb-09	10-Feb-09	17-Feb-09	24-Feb-09	03-Mar-09
Leachate Volume Added	mL	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Leachate Volume Recovered	mL	983	988	982	984	990	985	984	979	987	989	868
pH	-	7.22	8.16	7.08	7.34	7.39	7.36	7.23	7.14	7.03	7.21	6.97
Acidity	mg/L as CaCO3	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	5
Alkalinity	mg/L as CaCO3	10	12	9	10	9	10	9	10	9	9	7
Conductivity	µS/cm	48	60	59	56	55	51	52	62	54	54	53
Sulphate	mg/L	10	11	13	12	11	11	11	12	12	11	12
Calcium (Ca)	mg/L	8.82	9.24	10.2	9.74	9.36	9.56	10	9.54	9.73	9.91	8.36
Iron (Fe)	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Silver (Ag)	mg/L	< 0.00001					< 0.00001					0.00002
Aluminum (Al)	mg/L	0.02					0.02					0.03
Arsenic (As)	mg/L	0.0005					< 0.0002					0.0003
Barium (Ba)	mg/L	0.00392					0.00425					0.00384
Beryllium (Be)	mg/L	< 0.00002					< 0.00002					< 0.00002
Boron (B)	mg/L	< 0.0002					0.0006					0.0014
Bismuth (Bi)	mg/L	< 0.00001					< 0.00001					< 0.00001
Cadmium (Cd)	mg/L	0.000014					0.000008					0.000003
Cobalt (Co)	mg/L	0.000159					0.000195					0.000064
Chromium (Cr)	mg/L	< 0.0005					< 0.0005					< 0.0005
Copper (Cu)	mg/L	0.0023					0.0034					0.0044
Potassium (K)	mg/L	< 0.01					0.02					0.02
Lithium (Li)	mg/L	< 0.001					0.001					< 0.001
Magnesium (Mg)	mg/L	0.128					0.134					0.116
Manganese (Mn)	mg/L	0.04155					0.0457					0.02269
Molybdenum (Mo)	mg/L	< 0.00001					0.00009					0.00011
Nickel (Ni)	mg/L	0.0005					0.0006					0.0003
Lead (Pb)	mg/L	< 0.00002					0.00003					< 0.00002
Antimony (Sb)	mg/L	< 0.0002					0.0002					< 0.0002
Selenium (Se)	mg/L	< 0.001					< 0.001					< 0.001
Tin (Sn)	mg/L	0.00039					0.00034					0.00015
Strontium (Sr)	mg/L	0.0309					0.0321					0.0254
Titanium (Ti)	mg/L	< 0.0001					< 0.0001					< 0.0001
Thallium (Tl)	mg/L	0.000003					0.000003					0.000004
Uranium (U)	mg/L	0.000761					0.000098					0.000017
Vanadium (V)	mg/L	0.0001					0.00008					0.00009
Tungsten (W)	mg/L	< 0.00003					0.00004					< 0.00003
Yttrium (Y)	mg/L	0.000002					0.000002					0.000002
Zinc (Zn)	mg/L	< 0.001					0.002					< 0.001

Week#0 signifies the initial flooding of the humidity cell initiating the 20 week test period.

Humidity Cell Results from Sample MAR07-33

Analyte	Unit	Wk#76	Wk#77	Wk#78	Wk#79	Wk#80	Wk#81	Wk#82	Wk#83	Wk#84	Wk#85
		CA10009-MAR09	CA10057-MAR09	CA11117-MAR09	CA11275-MAR09	CA10022-APR09	CA10083-APR09	CA10058-APR09	CA11220-APR09	CA10006-MAY09	CA10025-MAY09
		10-Mar-09	17-Mar-09	24-Mar-09	31-Mar-09	07-Apr-09	14-Apr-09	21-Apr-09	28-Apr-09	05-May-09	12-May-09
Leachate Volume Added	mL	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Leachate Volume Recovered	mL	974	986	985	879	858	918	981	862	854	971
pH	-	7.05	7.35	7.28	7.1	7.07	7.13	7.16	7.16	7.14	7.13
Acidity	mg/L as CaCO3	3	< 2	3	9	6	5	6	6	5	2
Alkalinity	mg/L as CaCO3	7	9	8	6	6	6	7	7	6	7
Conductivity	µS/cm	48	53	55	54	54	48	58	55	54	46
Sulphate	mg/L	9.8	11	10	12	9.8	12	12	12	11	8.9
Calcium (Ca)	mg/L	8.11	8.96	8.9	8.48	8.56	8	9.15	9.76	8.83	7.88
Iron (Fe)	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Silver (Ag)	mg/L					0.00005					0.00007
Aluminum (Al)	mg/L					0.03					0.02
Arsenic (As)	mg/L					0.0002					< 0.0002
Barium (Ba)	mg/L					0.0042					0.00351
Beryllium (Be)	mg/L					< 0.00002					0.00003
Boron (B)	mg/L					0.0003					0.0006
Bismuth (Bi)	mg/L					< 0.00001					0.00003
Cadmium (Cd)	mg/L					0.000003					0.000029
Cobalt (Co)	mg/L					0.000118					0.00021
Chromium (Cr)	mg/L					< 0.0005					< 0.0005
Copper (Cu)	mg/L					0.007					0.0029
Potassium (K)	mg/L					0.02					0.02
Lithium (Li)	mg/L					< 0.001					< 0.001
Magnesium (Mg)	mg/L					0.121					0.106
Manganese (Mn)	mg/L					0.0211					0.0366
Molybdenum (Mo)	mg/L					0.00006					0.00006
Nickel (Ni)	mg/L					0.0004					0.0008
Lead (Pb)	mg/L					0.00002					0.00002
Antimony (Sb)	mg/L					< 0.0002					< 0.0002
Selenium (Se)	mg/L					< 0.001					< 0.001
Tin (Sn)	mg/L					0.00015					0.00012
Strontium (Sr)	mg/L					0.0265					0.0224
Titanium (Ti)	mg/L					< 0.0001					< 0.0001
Thallium (Tl)	mg/L					< 0.0002					< 0.0002
Uranium (U)	mg/L					0.000524					0.000054
Vanadium (V)	mg/L					0.00007					0.00009
Tungsten (W)	mg/L					< 0.00003					< 0.00003
Yttrium (Y)	mg/L					< 0.000001					0.000022
Zinc (Zn)	mg/L					< 0.001					0.001

Week#0 signifies the initial flooding of the humidity cell initiating the 20 week test period.

Humidity Cell Results from Sample MAR07-33

Analyte	Unit	Wk#86	Wk#87	Wk#88	Wk#89	Wk#90
		CA10055-MAY09	CA11098-MAY09	CA10006-JUN09	CA10024-JUN09	CA10042-JUN09
		19-May-09	26-May-09	02-Jun-09	09-Jun-09	16-Jun-09
Leachate Volume Added	mL	1000	1000	1000	1000	1000
Leachate Volume Recovered	mL	860	861	869	864	855
pH	-	6.84	7.23	7.07	7.11	7.03
Acidity	mg/L as CaCO3	7	2	3	< 2	5
Alkalinity	mg/L as CaCO3	5	6	4	6	6
Conductivity	µS/cm	54	44	15	58	44
Sulphate	mg/L	11	9.9	8.7	10	9.5
Calcium (Ca)	mg/L	8.14	7.96	6.92	8.00	7.75
Iron (Fe)	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Silver (Ag)	mg/L					0.00003
Aluminum (Al)	mg/L					0.02
Arsenic (As)	mg/L					0.0004
Barium (Ba)	mg/L					0.00299
Beryllium (Be)	mg/L					< 0.00002
Boron (B)	mg/L					0.0005
Bismuth (Bi)	mg/L					< 0.00001
Cadmium (Cd)	mg/L					0.000023
Cobalt (Co)	mg/L					0.000109
Chromium (Cr)	mg/L					< 0.0005
Copper (Cu)	mg/L					0.004
Potassium (K)	mg/L					0.02
Lithium (Li)	mg/L					< 0.001
Magnesium (Mg)	mg/L					0.114
Manganese (Mn)	mg/L					0.0176
Molybdenum (Mo)	mg/L					0.00008
Nickel (Ni)	mg/L					0.0005
Lead (Pb)	mg/L					0.00002
Antimony (Sb)	mg/L					< 0.0002
Selenium (Se)	mg/L					< 0.001
Tin (Sn)	mg/L					0.00005
Strontium (Sr)	mg/L					0.0216
Titanium (Ti)	mg/L					< 0.0001
Thallium (Tl)	mg/L					< 0.0002
Uranium (U)	mg/L					0.000027
Vanadium (V)	mg/L					0.00007
Tungsten (W)	mg/L					< 0.00003
Yttrium (Y)	mg/L					0.000009
Zinc (Zn)	mg/L					0.001

Week#0 signifies the initial flooding of the humidity cell initiating the 20 week test period.

Humidity Cell Results from Sample MAR07-15

Analyte	Unit	Wk#0	Wk#1	Wk#2	Wk#3	Wk#4	Wk#5	Wk#6	Wk#7	Wk#8	Wk#9	Wk#10
		CA10583-SEP07	CA10037-OCT07	CA10252-OCT07	CA10377-OCT07	CA10615-OCT07	CA10756-OCT07	CA10043-NOV07	CA10244-NOV07	CA10377-NOV07	CA10610-NOV07	CA10008-DEC07
		25-Sep-07	02-Oct-07	09-Oct-07	16-Oct-07	23-Oct-07	30-Oct-07	06-Nov-07	13-Nov-07	20-Nov-07	27-Nov-07	04-Dec-07
Leachate Volume Added	mL	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Leachate Volume Recovered	mL	788	958	954	977	910	919	906	847	883	NA	904
pH	-	7.38	7.20	7.58	7.15	7.94	7.44	7.46	7.15	7.16	7.23	7.22
Acidity	mg/L as CaCO3	< 2	10	8	7	7	12	15	24	14	13	13
Alkalinity	mg/L as CaCO3	11	12	9	11	9	9	9	8	8	8	7
Conductivity	µS/cm	102	224	160	156	104	87	93	115	93	76	82
Sulphate	mg/L	27	76	50	42	27	20	21	33	21	17	20
Calcium (Ca)	mg/L	10.9	22.5	16.3	18.8	10.1	10.0	9.98	14.7	10.6	8.28	10.3
Iron (Fe)	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Silver (Ag)	mg/L	0.00004	< 0.00001	< 0.00001			< 0.00001					< 0.00001
Aluminum (Al)	mg/L	0.03	0.03	0.03			0.03					0.03
Arsenic (As)	mg/L	< 0.0002	0.0004	0.0003			0.0003					< 0.0002
Barium (Ba)	mg/L	0.00278	0.00668	0.00444			0.00233					0.00224
Beryllium (Be)	mg/L	0.00002	< 0.00002	< 0.00002			< 0.00002					< 0.00002
Boron (B)	mg/L	0.0039	0.0090	0.0071			0.0050					0.0021
Bismuth (Bi)	mg/L	0.00002	< 0.00001	< 0.00001			< 0.00001					< 0.00001
Cadmium (Cd)	mg/L	< 0.000003	< 0.000003	< 0.000003			< 0.000003					0.000004
Cobalt (Co)	mg/L	0.000066	0.000207	0.000167			0.000040					0.000118
Chromium (Cr)	mg/L	< 0.0005	< 0.0005	< 0.0005			< 0.0005					< 0.0005
Copper (Cu)	mg/L	0.0011	0.0010	0.0010			0.0015					0.0031
Potassium (K)	mg/L	0.82	2.50	2.04			1.39					1.18
Lithium (Li)	mg/L	0.0018	0.0014	0.0008			0.0021					< 0.0007
Magnesium (Mg)	mg/L	0.821	3.01	2.38			1.43					1.61
Manganese (Mn)	mg/L	0.00734	0.0172	0.0179			0.0159					0.0185
Molybdenum (Mo)	mg/L	0.00139	0.00370	0.00280			0.00297					0.00067
Nickel (Ni)	mg/L	0.0006	0.0022	0.0016			0.0005					0.0004
Lead (Pb)	mg/L	0.00002	0.00002	0.00008			0.00002					< 0.00002
Antimony (Sb)	mg/L	0.00046	0.00034	0.00036			0.00029					0.00011
Selenium (Se)	mg/L	< 0.001	< 0.001	< 0.001			< 0.001					< 0.001
Tin (Sn)	mg/L	0.00551	0.00409	0.00273			0.00091					0.00038
Strontium (Sr)	mg/L	0.109	0.263	0.176			0.0943					0.0873
Titanium (Ti)	mg/L	< 0.0001	< 0.0001	< 0.0001			< 0.0001					< 0.0001
Thallium (Tl)	mg/L	< 0.00001	< 0.00001	< 0.00001			< 0.00001					< 0.000002
Uranium (U)	mg/L	0.000006	0.000030	0.000028			0.000024					0.000002
Vanadium (V)	mg/L	0.00051	0.00041	0.00032			0.00020					0.00015
Tungsten (W)	mg/L	0.00020	0.00022	0.00017			0.00007					0.00004
Yttrium (Y)	mg/L	0.000001	0.000002	0.000002			0.000001					0.000001
Zinc (Zn)	mg/L	0.001	< 0.001	0.002			0.002					0.001

Week#0 signifies the initial flooding of the humidity cell initiating the 20 week test period.

Humidity Cell Results from Sample MAR07-15

Analyte	Unit	Wk#11	Wk#12	Wk#13	Wk#14	Wk#15	Wk#16	Wk#17	Wk#18	Wk#19	Wk#20	Wk#21
		CA10163-DEC07	CA10307-DEC07	CA10483-DEC07	CA10001-JAN08	CA10088-JAN08	CA10221-JAN08	CA10366-JAN08	CA10526-JAN08	CA10012-FEB08	CA10179-FEB08	CA10305-FEB08
		11-Dec-07	19-Dec-07	24-Dec-07	02-Jan-08	08-Jan-08	16-Jan-08	22-Jan-08	29-Jan-08	05-Feb-08	12-Feb-08	19-Feb-08
Leachate Volume Added	mL	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Leachate Volume Recovered	mL	889	908	907	959	934	928	929	933	953	931	945
pH	-	6.79	6.81	6.96	6.96	7.2	7.3	7.05	7.15	7.03	6.95	7.22
Acidity	mg/L as CaCO3	14	11	13	8	5	2	6	6	3	6	< 2
Alkalinity	mg/L as CaCO3	7	8	7	8	8	8	7	6	7	6	7
Conductivity	µS/cm	97	71	80	116	75	78	80	93	86	77	83
Sulphate	mg/L	25	19	23	29	19	20	23	27	28	23	28
Calcium (Ca)	mg/L	11.6	10.1	9.13	14.9	9.8	9.14	10.5	12.7	12.7	10.3	12.8
Iron (Fe)	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Silver (Ag)	mg/L					< 0.00001					< 0.00001	
Aluminum (Al)	mg/L					0.03					0.03	
Arsenic (As)	mg/L					< 0.0002					< 0.0002	
Barium (Ba)	mg/L					0.00201					0.00194	
Beryllium (Be)	mg/L					< 0.00002					< 0.00002	
Boron (B)	mg/L					0.0018					0.0008	
Bismuth (Bi)	mg/L					< 0.00001					< 0.00001	
Cadmium (Cd)	mg/L					0.000006					0.000008	
Cobalt (Co)	mg/L					0.000152					0.000205	
Chromium (Cr)	mg/L					< 0.0005					< 0.0005	
Copper (Cu)	mg/L					0.0019					0.0032	
Potassium (K)	mg/L					0.93					0.77	
Lithium (Li)	mg/L					0.002					< 0.001	
Magnesium (Mg)	mg/L					1.08					1.07	
Manganese (Mn)	mg/L					0.0194					0.0194	
Molybdenum (Mo)	mg/L					0.0003					0.0003	
Nickel (Ni)	mg/L					0.0004					0.0006	
Lead (Pb)	mg/L					< 0.00002					< 0.00002	
Antimony (Sb)	mg/L					0.00012					0.00025	
Selenium (Se)	mg/L					< 0.001					< 0.001	
Tin (Sn)	mg/L					0.00032					0.00015	
Strontium (Sr)	mg/L					0.0718					0.0694	
Titanium (Ti)	mg/L					< 0.0001					< 0.0001	
Thallium (Tl)	mg/L					< 0.000002					< 0.000002	
Uranium (U)	mg/L					0.000001					0.000137	
Vanadium (V)	mg/L					0.00009					< 0.00003	
Tungsten (W)	mg/L					< 0.00003					0.0001	
Yttrium (Y)	mg/L					< 0.000001					0.000009	
Zinc (Zn)	mg/L					0.001					0.002	

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Humidity Cell Results from Sample MAR07-15

Analyte	Unit	Wk#22	Wk#23	Wk#24	Wk#25	Wk#26	Wk#27	Wk#28	Wk#29	Wk#30	Wk#31
		CA10425-FEB08	CA10014-MAR08	CA10155-MAR08	CA10275-MAR08	CA10378-MAR08	CA10017-APR08	CA10186-APR08	CA10299-APR08	CA10503-APR08	CA10616-APR08
		26-Feb-08	04-Mar-08	11-Mar-08	18-Mar-08	25-Mar-08	01-Apr-08	08-Apr-08	15-Apr-08	22-Apr-08	29-Apr-08
Leachate Volume Added	mL	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Leachate Volume Recovered	mL	918	931	937	952	893	951	925	884	852	958
pH	-	7.09	7.6	7.25	6.82	7.01	6.77	6.90	6.92	6.93	7.16
Acidity	mg/L as CaCO3	< 2	< 2	< 2	5	4	3	3	< 2	6	2
Alkalinity	mg/L as CaCO3	6	12	7	5	8	7	8	9	8	8
Conductivity	µS/cm	94	106	96	81	86	81	99	89	111	80
Sulphate	mg/L	22	29	31	27	26	24	31	26	33	23
Calcium (Ca)	mg/L	10.7	15.1	14.2	11.9	12.3	14.6	14.8	12.3	15.6	11.7
Iron (Fe)	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Silver (Ag)	mg/L				< 0.00001					< 0.00001	
Aluminum (Al)	mg/L				0.04					0.02	
Arsenic (As)	mg/L				< 0.0002					< 0.0002	
Barium (Ba)	mg/L				0.00248					0.00305	
Beryllium (Be)	mg/L				< 0.00002					< 0.00002	
Boron (B)	mg/L				0.0011					0.0006	
Bismuth (Bi)	mg/L				< 0.00001					< 0.00001	
Cadmium (Cd)	mg/L				0.000005					< 0.000003	
Cobalt (Co)	mg/L				0.000233					0.000373	
Chromium (Cr)	mg/L				< 0.0005					< 0.0005	
Copper (Cu)	mg/L				0.0031					0.0071	
Potassium (K)	mg/L				0.74					0.81	
Lithium (Li)	mg/L				0.001					< 0.001	
Magnesium (Mg)	mg/L				0.999					1.02	
Manganese (Mn)	mg/L				0.023					0.0241	
Molybdenum (Mo)	mg/L				0.00022					0.00017	
Nickel (Ni)	mg/L				0.0008					0.001	
Lead (Pb)	mg/L				< 0.00002					< 0.00002	
Antimony (Sb)	mg/L				0.00017					0.00008	
Selenium (Se)	mg/L				< 0.001					< 0.001	
Tin (Sn)	mg/L				0.00042					0.00041	
Strontium (Sr)	mg/L				0.0758					0.089	
Titanium (Ti)	mg/L				0.0001					< 0.0001	
Thallium (Tl)	mg/L				< 0.000002					< 0.000002	
Uranium (U)	mg/L				0.000009					< 0.000001	
Vanadium (V)	mg/L				0.0001					0.00004	
Tungsten (W)	mg/L				0.00013					< 0.00003	
Yttrium (Y)	mg/L				< 0.000001					< 0.000001	
Zinc (Zn)	mg/L				0.001					< 0.001	

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Humidity Cell Results from Sample MAR07-15

Analyte	Unit	Wk#32	Wk#33	Wk#34	Wk#35	Wk#36	Wk#37	Wk#38	Wk#39	Wk#40	Wk#41	Wk#42
		CA10074-MAY08	CA10110-MAY08	CA10136-MAY08	CA10666-MAY08	CA10007-JUN08	CA10038-JUN08	CA10088-JUN08	CA10368-JUN08	CA10009-JUL08	CA10036-JUL08	CA10113-JUL08
		06-May-08	13-May-08	20-May-08	27-May-08	03-Jun-08	10-Jun-08	17-Jun-08	24-Jun-08	01-Jul-08	08-Jul-08	15-Jul-08
Leachate Volume Added	mL	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Leachate Volume Recovered	mL	859	881	886	877	900	896	967	971	964	964	899
pH	-	6.78	6.90	7.25	7.21	7.25	7.07	7.25	7.16	7.18	7.22	6.87
Acidity	mg/L as CaCO3	8	6	6	5	3	4	< 2	< 2	< 2	< 2	< 2
Alkalinity	mg/L as CaCO3	5	6	10	7	8	10	12	11	11	22	12
Conductivity	µS/cm	101	82	105	100	84	86	114	108	107	128	84
Sulphate	mg/L	31	21	26	29	25	27	37	37	32	33	24
Calcium (Ca)	mg/L	14.3	11.4	14.9	14.5	12.3	14	18.8	19.5	16.5	20.2	13
Iron (Fe)	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Silver (Ag)	mg/L				< 0.00001					< 0.00001		
Aluminum (Al)	mg/L				0.02					0.02		
Arsenic (As)	mg/L				0.0003					0.0003		
Barium (Ba)	mg/L				0.00259					0.00393		
Beryllium (Be)	mg/L				< 0.00002					< 0.00002		
Boron (B)	mg/L				0.0009					0.0011		
Bismuth (Bi)	mg/L				< 0.00001					< 0.00001		
Cadmium (Cd)	mg/L				0.000004					0.000012		
Cobalt (Co)	mg/L				0.000225					0.000559		
Chromium (Cr)	mg/L				< 0.0005					< 0.0005		
Copper (Cu)	mg/L				0.0041					0.0053		
Potassium (K)	mg/L				0.78					0.74		
Lithium (Li)	mg/L				0.001					0.001		
Magnesium (Mg)	mg/L				0.976					0.923		
Manganese (Mn)	mg/L				0.0198					0.0408		
Molybdenum (Mo)	mg/L				0.00012					0.00019		
Nickel (Ni)	mg/L				0.0007					0.0017		
Lead (Pb)	mg/L				< 0.00002					< 0.00002		
Antimony (Sb)	mg/L				0.00009					0.00029		
Selenium (Se)	mg/L				< 0.001					< 0.001		
Tin (Sn)	mg/L				0.0001					0.00025		
Strontium (Sr)	mg/L				0.0789					0.0863		
Titanium (Ti)	mg/L				< 0.0001					< 0.0001		
Thallium (Tl)	mg/L				0.000015					0.000002		
Uranium (U)	mg/L				0.000005					0.000005		
Vanadium (V)	mg/L				0.00011					< 0.00003		
Tungsten (W)	mg/L				< 0.00003					0.00003		
Yttrium (Y)	mg/L				0.000001					0.000003		
Zinc (Zn)	mg/L				< 0.001					0.008		

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Humidity Cell Results from Sample MAR07-15

Analyte	Unit	Wk#43	Wk#44	Wk#45	Wk#46	Wk#47	Wk#48	Wk #49	Wk #50	Wk #51	Wk #52	Wk #53
		CA10139-JUL08	CA10444-JUL08	CA10009-AUG08	CA10035-AUG08	CA10417-AUG08	CA10490-AUG08	CA10007-SEP08	CA10035-SEP08	CA10199-SEP08	CA10453-SEP08	CA10613-SEP08
		22-Jul-08	29-Jul-08	05-Aug-08	12-Aug-08	19-Aug-08	26-Aug-08	02-Sep-08	09-Sep-08	16-Sep-08	23-Sep-08	30-Sep-08
Leachate Volume Added	mL	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Leachate Volume Recovered	mL	937	935	861	918	845	957	889	852	936	885	902
pH	-	6.76	6.95	7.08	7.19	7.05	6.94	7.06	7.46	6.99	7.19	7.17
Acidity	mg/L as CaCO3	3	3	< 2	2	6	6	7	< 2	10	5	6
Alkalinity	mg/L as CaCO3	9	8	10	8	8	7	8	16	10	11	10
Conductivity	µS/cm	92	90	76	96	125	79	84	106	101	86	88
Sulphate	mg/L	25	25	19	20	26	21	22	28	26	22	23
Calcium (Ca)	mg/L	13.8	13.3	11.2	11.2	14.6	11.8	12.8	18.8	15.2	13.6	14.2
Iron (Fe)	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Silver (Ag)	mg/L			< 0.00001					< 0.00001			
Aluminum (Al)	mg/L			0.03					0.05			
Arsenic (As)	mg/L			< 0.0002					0.0002			
Barium (Ba)	mg/L			0.00239					0.0038			
Beryllium (Be)	mg/L			< 0.00002					< 0.00002			
Boron (B)	mg/L			0.0005					0.0006			
Bismuth (Bi)	mg/L			< 0.00001					< 0.00001			
Cadmium (Cd)	mg/L			0.000005					< 0.000003			
Cobalt (Co)	mg/L			0.000329					0.000415			
Chromium (Cr)	mg/L			< 0.0005					< 0.0005			
Copper (Cu)	mg/L			0.0038					0.0071			
Potassium (K)	mg/L			0.5					0.76			
Lithium (Li)	mg/L			< 0.001					< 0.001			
Magnesium (Mg)	mg/L			0.639					1.03			
Manganese (Mn)	mg/L			0.0246					0.0344			
Molybdenum (Mo)	mg/L			0.00007					0.00011			
Nickel (Ni)	mg/L			0.001					0.0015			
Lead (Pb)	mg/L			< 0.00002					< 0.00002			
Antimony (Sb)	mg/L			0.00012					0.0001			
Selenium (Se)	mg/L			< 0.001					< 0.001			
Tin (Sn)	mg/L			0.00012					0.00011			
Strontium (Sr)	mg/L			0.054					0.0814			
Titanium (Ti)	mg/L			< 0.0001					< 0.0001			
Thallium (Tl)	mg/L			< 0.000002					< 0.000002			
Uranium (U)	mg/L			0.000007					0.000033			
Vanadium (V)	mg/L			0.00013					0.00007			
Tungsten (W)	mg/L			< 0.00003					< 0.00003			
Yttrium (Y)	mg/L			0.000001					0.000002			
Zinc (Zn)	mg/L			< 0.001					< 0.001			

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Humidity Cell Results from Sample MAR07-15

Analyte	Unit	Wk #54	Wk #55	Wk #56	Wk #57	Wk #58	Wk #59	Wk #60	Wk #61	Wk #62	Wk #63	Wk #64
		CA10093-OCT08	CA10259-OCT08	CA10456-OCT08	CA10647-OCT08	CA10006-NOV08	CA10046-NOV08	CA10232-NOV08	CA10409-NOV08	CA10012-DEC08	CA10041-DEC08	CA10126-DEC08
		07-Oct-08	14-Oct-08	21-Oct-08	28-Oct-08	04-Nov-08	11-Nov-08	18-Nov-08	25-Nov-08	02-Dec-08	09-Dec-08	16-Dec-08
Leachate Volume Added	mL	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Leachate Volume Recovered	mL	903	916	892	854	851	876	862	891	944	915	924
pH	-	7.2	7.18	7.13	7.32	7.25	7.17	7.31	7.16	7.15	7.23	7.23
Acidity	mg/L as CaCO3	7	5	8	8	6	8	8	9	8	8	8
Alkalinity	mg/L as CaCO3	9	8	9	11	13	11	11	12	14	11	12
Conductivity	µS/cm	87	88	86	105	112	91	99	89	115	92	102
Sulphate	mg/L	22	21	21	25	27	24	25	23	28	20	26
Calcium (Ca)	mg/L	13.5	13.1	13.2	14.9	17	15.4	15.8	15.3	18.4	14.3	17.7
Iron (Fe)	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Silver (Ag)	mg/L		< 0.00001					< 0.00001				
Aluminum (Al)	mg/L		0.02					0.04				
Arsenic (As)	mg/L		0.0002					< 0.0002				
Barium (Ba)	mg/L		0.00287					0.00378				
Beryllium (Be)	mg/L		< 0.00002					< 0.00002				
Boron (B)	mg/L		0.0003					0.0005				
Bismuth (Bi)	mg/L		< 0.00001					< 0.00001				
Cadmium (Cd)	mg/L		0.000005					0.000005				
Cobalt (Co)	mg/L		0.000558					0.000451				
Chromium (Cr)	mg/L		< 0.0005					< 0.0005				
Copper (Cu)	mg/L		0.0058					0.0088				
Potassium (K)	mg/L		0.53					0.62				
Lithium (Li)	mg/L		< 0.001					< 0.001				
Magnesium (Mg)	mg/L		0.854					0.914				
Manganese (Mn)	mg/L		0.0307					0.0262				
Molybdenum (Mo)	mg/L		0.00011					0.00007				
Nickel (Ni)	mg/L		0.0024					0.0016				
Lead (Pb)	mg/L		< 0.00002					< 0.00002				
Antimony (Sb)	mg/L		0.00018					< 0.0002				
Selenium (Se)	mg/L		< 0.001					< 0.001				
Tin (Sn)	mg/L		0.00013					0.00008				
Strontium (Sr)	mg/L		0.059					0.0642				
Titanium (Ti)	mg/L		0.0001					< 0.0001				
Thallium (Tl)	mg/L		< 0.000002					0.000002				
Uranium (U)	mg/L		0.000011					0.000019				
Vanadium (V)	mg/L		< 0.00003					0.00003				
Tungsten (W)	mg/L		0.00004					< 0.00003				
Yttrium (Y)	mg/L		< 0.000001					< 0.000001				
Zinc (Zn)	mg/L		0.001					< 0.001				

Week#0 signifies the initial flooding of the humidity cell initiating the 20 week test period.

Humidity Cell Results from Sample MAR07-15

Analyte	Unit	Wk #65	Wk #66	Wk #67	Wk #68	Wk #69	Wk#70	Wk#71	Wk#72	Wk#73	Wk#74	Wk#75
		CA10269-DEC08	CA10504-DEC08	CA10012-JAN09	CA10043-JAN09	CA10135-JAN-09	CA10182-JAN-09	CA10010-FEB09	CA10036-FEB09	CA10061-FEB09	CA10106-FEB09	CA10045-MAR09
		23-Dec-08	29-Dec-08	06-Jan-09	13-Jan-09	20-Jan-09	27-Jan-09	03-Feb-09	10-Feb-09	17-Feb-09	24-Feb-09	03-Mar-09
Leachate Volume Added	mL	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Leachate Volume Recovered	mL	907	894	895	875	915	889	862	848	844	846	867
pH	-	7.29	7.26	7.17	7.48	7.48	7.4	7.35	7.35	7.29	7.3	6.96
Acidity	mg/L as CaCO3	7	11	14	9	10	9	11	7	8	7	12
Alkalinity	mg/L as CaCO3	12	11	11	12	10	12	11	14	15	13	12
Conductivity	µS/cm	81	96	111	104	105	90	96	116	118	111	122
Sulphate	mg/L	20	22	29	26	26	26	25	27	31	29	32
Calcium (Ca)	mg/L	14	15.3	17.8	17	16.7	16.4	17.3	17.5	20.2	18.9	19.4
Iron (Fe)	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Silver (Ag)	mg/L	< 0.00001					< 0.00001					< 0.00001
Aluminum (Al)	mg/L	0.03					0.03					0.02
Arsenic (As)	mg/L	0.0004					0.0002					< 0.0002
Barium (Ba)	mg/L	0.00335					0.0037					0.00451
Beryllium (Be)	mg/L	< 0.00002					< 0.00002					< 0.00002
Boron (B)	mg/L	< 0.0002					0.0004					0.0023
Bismuth (Bi)	mg/L	< 0.00001					< 0.00001					< 0.00001
Cadmium (Cd)	mg/L	0.000007					< 0.000003					0.000005
Cobalt (Co)	mg/L	0.000635					0.000812					0.000812
Chromium (Cr)	mg/L	< 0.0005					< 0.0005					< 0.0005
Copper (Cu)	mg/L	0.0056					0.0076					0.0085
Potassium (K)	mg/L	0.53					0.56					0.62
Lithium (Li)	mg/L	< 0.001					< 0.001					< 0.001
Magnesium (Mg)	mg/L	0.831					0.95					0.893
Manganese (Mn)	mg/L	0.02815					0.0296					0.03557
Molybdenum (Mo)	mg/L	< 0.00001					0.00006					0.00016
Nickel (Ni)	mg/L	0.002					0.0027					0.0031
Lead (Pb)	mg/L	< 0.00002					< 0.00002					0.00003
Antimony (Sb)	mg/L	< 0.0002					0.0002					< 0.0002
Selenium (Se)	mg/L	< 0.001					< 0.001					< 0.001
Tin (Sn)	mg/L	0.00009					0.0002					0.00012
Strontium (Sr)	mg/L	0.0555					0.062					0.0681
Titanium (Ti)	mg/L	0.0001					< 0.0001					< 0.0001
Thallium (Tl)	mg/L	0.000004					0.000004					0.000005
Uranium (U)	mg/L	0.001044					0.000031					0.000052
Vanadium (V)	mg/L	0.00003					0.00003					0.00004
Tungsten (W)	mg/L	< 0.00003					< 0.00003					< 0.00003
Yttrium (Y)	mg/L	0.000001					0.000001					0.000002
Zinc (Zn)	mg/L	< 0.001					0.001					< 0.001

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Humidity Cell Results from Sample MAR07-15

Analyte	Unit	Wk#76	Wk#77	Wk#78	Wk#79	Wk#80	Wk#81	Wk#82	Wk#83	Wk#84	Wk#85
		CA10009-MAR09	CA10057-MAR09	CA11117-MAR09	CA11275-MAR09	CA10022-APR09	CA10083-APR09	CA10058-APR09	CA11220-APR09	CA10006-MAY09	CA10025-MAY09
		10-Mar-09	17-Mar-09	24-Mar-09	31-Mar-09	07-Apr-09	14-Apr-09	21-Apr-09	28-Apr-09	05-May-09	12-May-09
Leachate Volume Added	mL	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Leachate Volume Recovered	mL	854	842	843	858	881	948	838	841	858	840
pH	-	7.23	7.63	7.5	7.47	7.17	7.47	7.48	7.5	7.36	7.50
Acidity	mg/L as CaCO3	7	8	8	11	10	10	5	11	13	3
Alkalinity	mg/L as CaCO3	13	16	14	15	13	15	16	17	12	16
Conductivity	µS/cm	114	128	128	128	128	140	126	142	114	117
Sulphate	mg/L	28	31	31	33	29	39	30	35	29	29
Calcium (Ca)	mg/L	18.6	21.3	20.5	20	20.4	24.3	20.2	25.6	19.2	20.3
Iron (Fe)	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Silver (Ag)	mg/L					0.00014					0.00008
Aluminum (Al)	mg/L					0.03					0.02
Arsenic (As)	mg/L					< 0.0002					< 0.0002
Barium (Ba)	mg/L					0.00497					0.0052
Beryllium (Be)	mg/L					< 0.00002					< 0.00002
Boron (B)	mg/L					0.0004					0.0007
Bismuth (Bi)	mg/L					< 0.00001					0.00003
Cadmium (Cd)	mg/L					0.000005					0.000025
Cobalt (Co)	mg/L					0.00108					0.00145
Chromium (Cr)	mg/L					< 0.0005					< 0.0005
Copper (Cu)	mg/L					0.0081					0.0159
Potassium (K)	mg/L					0.6					0.59
Lithium (Li)	mg/L					< 0.001					< 0.001
Magnesium (Mg)	mg/L					0.891					0.764
Manganese (Mn)	mg/L					0.0401					0.0531
Molybdenum (Mo)	mg/L					0.00009					0.00007
Nickel (Ni)	mg/L					0.0036					0.0058
Lead (Pb)	mg/L					< 0.00002					0.00035
Antimony (Sb)	mg/L					< 0.0002					< 0.0002
Selenium (Se)	mg/L					< 0.001					< 0.001
Tin (Sn)	mg/L					0.00013					0.00013
Strontium (Sr)	mg/L					0.0681					0.0628
Titanium (Ti)	mg/L					0.0002					0.0002
Thallium (Tl)	mg/L					< 0.0002					< 0.0002
Uranium (U)	mg/L					0.00175					0.000027
Vanadium (V)	mg/L					0.00004					0.00004
Tungsten (W)	mg/L					< 0.00003					< 0.00003
Yttrium (Y)	mg/L					< 0.000001					0.000009
Zinc (Zn)	mg/L					0.001					0.001

Week#0 signifies the initial flooding of the humidity cell initiating the 20 week test period.

Humidity Cell Results from Sample MAR07-15

Analyte	Unit	Wk#86	Wk#87	Wk#88	Wk#89	Wk#90	Wk#91	Wk#92	Wk#93	Wk#94	Wk#95	Wk#96
		CA10055-MAY09	CA11098-MAY09	CA10006-JUN09	CA10024-JUN09	CA10042-JUN09	CA11088-JUN09	CA11138-JUN09	CA10004-JUL09	CA10022-JUL09	CA10041-JUL09	CA11071-JUL09
		19-May-09	26-May-09	02-Jun-09	09-Jun-09	16-Jun-09	23-Jun-09	30-Jun-09	07-Jul-09	14-Jul-09	21-Jul-09	28-Jul-09
Leachate Volume Added	mL	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Leachate Volume Recovered	mL	841	845	835	844	842	843	836	888	872	849	839
pH	-	7.09	7.56	7.46	7.44	7.34	7.32	7.58	7.18	7.18	6.98	7.00
Acidity	mg/L as CaCO3	11	6	8	9	9	28	9	20	14	16	17
Alkalinity	mg/L as CaCO3	12	16	16	17	14	16	17	11	13	12	13
Conductivity	µS/cm	115	117	132	123	105	116	135	118	121	120	127
Sulphate	mg/L	27	30	31	31	23	24	30	30	31	31	33
Calcium (Ca)	mg/L	18.3	21.2	21.4	20.8	18.4	19.7	22.5	19.6	21.0	20.5	21.9
Iron (Fe)	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Silver (Ag)	mg/L					0.00003					0.00001	
Aluminum (Al)	mg/L					0.02					0.02	
Arsenic (As)	mg/L					< 0.0002					< 0.0002	
Barium (Ba)	mg/L					0.00465					0.00524	
Beryllium (Be)	mg/L					< 0.00002					< 0.00002	
Boron (B)	mg/L					0.001					0.0006	
Bismuth (Bi)	mg/L					0.00001					0.00001	
Cadmium (Cd)	mg/L					0.000041					0.000008	
Cobalt (Co)	mg/L					0.00122					0.00144	
Chromium (Cr)	mg/L					< 0.0005					< 0.0005	
Copper (Cu)	mg/L					0.011					0.0126	
Potassium (K)	mg/L					0.54					0.51	
Lithium (Li)	mg/L					< 0.001					0.001	
Magnesium (Mg)	mg/L					0.63					0.756	
Manganese (Mn)	mg/L					0.0403					0.0484	
Molybdenum (Mo)	mg/L					0.00012					0.00007	
Nickel (Ni)	mg/L					0.0052					0.0056	
Lead (Pb)	mg/L					0.00002					0.00002	
Antimony (Sb)	mg/L					< 0.0002					< 0.0002	
Selenium (Se)	mg/L					< 0.001					< 0.001	
Tin (Sn)	mg/L					0.00009					0.0001	
Strontium (Sr)	mg/L					0.0549					0.0597	
Titanium (Ti)	mg/L					0.0002					0.0002	
Thallium (Tl)	mg/L					< 0.0002					< 0.0002	
Uranium (U)	mg/L					0.000029					0.000002	
Vanadium (V)	mg/L					0.00005					0.00003	
Tungsten (W)	mg/L					< 0.00003					< 0.00003	
Yttrium (Y)	mg/L					0.000019					< 0.000001	
Zinc (Zn)	mg/L					0.002					< 0.001	

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Humidity Cell Results from Sample MAR07-15

Analyte	Unit	Wk#97	Wk#98	Wk#99	Wk#100	Wk#101	Wk#102	Wk#103	Wk#104	Wk#105	Wk#106	Wk#107
		CA10003-AUG09	CA10035-AUG09	CA10162-AUG09	CA10179-AUG09	CA10002-SEP09	CA10019-SEP09	CA10036-SEP09	CA10151-SEP09	CA11058-SEP09	CA10014-OCT09	CA11047-OCT09
		04-Aug-09	11-Aug-09	18-Aug-09	25-Aug-09	01-Sep-09	08-Sep-09	15-Sep-09	22-Sep-09	29-Sep-09	06-Oct-09	13-Oct-09
Leachate Volume Added	mL	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Leachate Volume Recovered	mL	838	845	846	844	952	854	844	846	855	848	896
pH	-	7.49	6.76	6.97	7.05	6.80	7.26	6.89	7.45	7.37	7.38	7.39
Acidity	mg/L as CaCO3	11	17	13	12	13	6	39	7	16	7	12
Alkalinity	mg/L as CaCO3	15	12	13	13	16	15	12	15	13	13	12
Conductivity	µS/cm	136	131	128	114	149	118	110	121	115	104	105
Sulphate	mg/L	35	32	33	29	39	28	31	30	30	24	24
Calcium (Ca)	mg/L	22.6	21.4	21.1	18.8	25.9	23.7	19.5	20.1	20.5	18.4	17.9
Iron (Fe)	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Silver (Ag)	mg/L				0.00001					0.00001		
Aluminum (Al)	mg/L				0.02					0.01		
Arsenic (As)	mg/L				0.001					0.0019		
Barium (Ba)	mg/L				0.00455					0.00522		
Beryllium (Be)	mg/L				< 0.00002					< 0.00002		
Boron (B)	mg/L				0.0005					0.0007		
Bismuth (Bi)	mg/L				< 0.00001					< 0.00001		
Cadmium (Cd)	mg/L				0.000034					0.000008		
Cobalt (Co)	mg/L				0.001496					0.0016		
Chromium (Cr)	mg/L				< 0.0005					< 0.0005		
Copper (Cu)	mg/L				0.0164					0.0145		
Potassium (K)	mg/L				0.44					0.42		
Lithium (Li)	mg/L				< 0.001					< 0.001		
Magnesium (Mg)	mg/L				0.608					0.668		
Manganese (Mn)	mg/L				0.0427					0.0456		
Molybdenum (Mo)	mg/L				0.00011					0.00013		
Nickel (Ni)	mg/L				0.0062					0.0064		
Lead (Pb)	mg/L				< 0.00002					< 0.00002		
Antimony (Sb)	mg/L				0.0005					0.0002		
Selenium (Se)	mg/L				< 0.001					< 0.001		
Tin (Sn)	mg/L				0.0001					0.00013		
Strontium (Sr)	mg/L				0.0522					0.056		
Titanium (Ti)	mg/L				< 0.0001					< 0.0001		
Thallium (Tl)	mg/L				< 0.0002					< 0.0002		
Uranium (U)	mg/L				0.000001					0.000045		
Vanadium (V)	mg/L				< 0.00003					< 0.00003		
Tungsten (W)	mg/L				< 0.00003					< 0.00003		
Yttrium (Y)	mg/L				< 0.000001					0.000001		
Zinc (Zn)	mg/L				0.003					< 0.001		

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Humidity Cell Results from Sample MAR07-15

Analyte	Unit	Wk#108	Wk#109	Wk#110	Wk#111	Wk#112	Wk#113	Wk#114	Wk#115	Wk#116	Wk#117	Wk#118
		CA11057-OCT09	CA11166-OCT09	CA10007-NOV09	CA11043-NOV09	CA11124-NOV09	CA11145-NOV09	CA10003-DEC09	CA10028-DEC09	CA10053-DEC09	CA11201-DEC09	CA11234-DEC09
		20-Oct-09	27-Oct-09	03-Nov-09	10-Nov-09	17-Nov-09	24-Nov-09	01-Dec-09	08-Dec-09	15-Dec-09	22-Dec-09	29-Dec-09
Leachate Volume Added	mL	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Leachate Volume Recovered	mL	866	837	874	921	974	975	986	980	956	989	950
pH	-	7.54	7.24	7.32	7.3	7.55	7.46	7.73	7.60	7.42	7.56	7.80
Acidity	mg/L as CaCO3	13	17	20	16	< 2	< 2	< 2	2	< 2	< 2	< 2
Alkalinity	mg/L as CaCO3	15	14	13	13	24	23	23	23	24	25	25
Conductivity	µS/cm	123	136	138	128	146	128	107	114	113	102	110
Sulphate	mg/L	31	36	38	33	44	30	26	24	23	22	21
Calcium (Ca)	mg/L	20.7	24.2	26	21.8	26.1	21.9	19.4	21.5	19.6	18.2	18.3
Iron (Fe)	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Silver (Ag)	mg/L			0.00004					0.00002			
Aluminum (Al)	mg/L			0.01					< 0.01			
Arsenic (As)	mg/L			< 0.0002					0.0005			
Barium (Ba)	mg/L			0.00577					0.00547			
Beryllium (Be)	mg/L			0.00007					< 0.00002			
Boron (B)	mg/L			0.0019					0.0007			
Bismuth (Bi)	mg/L			0.00002					< 0.00001			
Cadmium (Cd)	mg/L			0.000009					0.000011			
Cobalt (Co)	mg/L			0.00185					0.00234			
Chromium (Cr)	mg/L			< 0.0005					< 0.0005			
Copper (Cu)	mg/L			0.016				0.016	0.0179			
Potassium (K)	mg/L			0.48					0.44			
Lithium (Li)	mg/L			0.003					< 0.001			
Magnesium (Mg)	mg/L			0.907					0.653			
Manganese (Mn)	mg/L			0.0506					0.0638			
Molybdenum (Mo)	mg/L			0.0002					0.00012			
Nickel (Ni)	mg/L			0.0075					0.0081			
Lead (Pb)	mg/L			0.00003					0.00003			
Antimony (Sb)	mg/L			0.0008					< 0.0002			
Selenium (Se)	mg/L			< 0.001					< 0.001			
Tin (Sn)	mg/L			0.00027					0.00025			
Strontium (Sr)	mg/L			0.0695					0.0566			
Titanium (Ti)	mg/L			< 0.0001					< 0.0001			
Thallium (Tl)	mg/L			< 0.0002					< 0.0002			
Uranium (U)	mg/L			0.000011					< 0.000001			
Vanadium (V)	mg/L			< 0.00003					< 0.00003			
Tungsten (W)	mg/L			0.00021					< 0.00003			
Yttrium (Y)	mg/L			0.000002					< 0.000001			
Zinc (Zn)	mg/L			< 0.001					< 0.001			

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Humidity Cell Results from Sample MAR07-15

Analyte	Unit	Wk#119	Wk#120	Wk#121	Wk#122	Wk#123	Wk#124	Wk#125	Wk#126	Wk#127	Wk#128	Wk#129
		CA10003-JAN10	CA10027-JAN10	CA10053-JAN10	CA10078-JAN10	CA10003-FEB10	CA10028-FEB10	CA10057-FEB10	CA10083-FEB10	CA10003-MAR10	CA10029-MAR10	CA10055-MAR10
		05-Jan-10	12-Jan-10	19-Jan-09	26-Jan-09	02-Feb-09	09-Feb-10	16-Feb-10	23-Feb-10	02-Mar-10	09-Mar-10	16-Mar-10
Leachate Volume Added	mL	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Leachate Volume Recovered	mL	989	984	949	979	957	951	990	975	962	904	844
pH	-	7.69	7.7	7.55	7.76	7.8	7.71	7.72	7.63	7.59	7.37	7.42
Acidity	mg/L as CaCO3	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	4	21	16
Alkalinity	mg/L as CaCO3	24	24	24	25	25	25	23	28	20	13	13
Conductivity	µS/cm	103	115	108	103	96	95	91	97	122	113	133
Sulphate	mg/L	22	22	21	18	18	16	15	26	24	25	31
Calcium (Ca)	mg/L	18.6	18.8	18.2	17.2	16.4	15.7	14.9	19.5	19.7	20.5	20.5
Iron (Fe)	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Silver (Ag)	mg/L		0.00003					< 0.00001				
Aluminum (Al)	mg/L		0.02					0.02				
Arsenic (As)	mg/L		0.0015					< 0.0002				
Barium (Ba)	mg/L		0.00557					0.00459				
Beryllium (Be)	mg/L		< 0.00002					< 0.00002				
Boron (B)	mg/L		0.0007					0.0005				
Bismuth (Bi)	mg/L		< 0.00001					< 0.00001				
Cadmium (Cd)	mg/L		0.000011					0.000009				
Cobalt (Co)	mg/L		0.00179					0.00151				
Chromium (Cr)	mg/L		< 0.0005					< 0.0005				
Copper (Cu)	mg/L		0.0168					0.0126				
Potassium (K)	mg/L		0.47					0.39				
Lithium (Li)	mg/L		< 0.001					< 0.001				
Magnesium (Mg)	mg/L		0.576					0.463				
Manganese (Mn)	mg/L		0.0485					0.0403				
Molybdenum (Mo)	mg/L		0.00016					0.00015				
Nickel (Ni)	mg/L		0.0057					0.005				
Lead (Pb)	mg/L		0.00002					0.00005				
Antimony (Sb)	mg/L		0.0003					< 0.0002				
Selenium (Se)	mg/L		< 0.001					< 0.001				
Tin (Sn)	mg/L		0.00026					0.00021				
Strontium (Sr)	mg/L		0.0515					0.0414				
Titanium (Ti)	mg/L		0.0002					< 0.0001				
Thallium (Tl)	mg/L		< 0.0002					< 0.0002				
Uranium (U)	mg/L		0.000004					0.000001				
Vanadium (V)	mg/L		0.00005					0.00004				
Tungsten (W)	mg/L		< 0.00003					< 0.00003				
Yttrium (Y)	mg/L		0.000002					0.000001				
Zinc (Zn)	mg/L		0.001					< 0.001				

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Humidity Cell Results from Sample MAR07-15

Analyte	Unit	Wk#130	Wk#131	Wk#132	Wk#133	Wk#134	Wk#135	Wk#136	Wk#137	Wk# 138	Wk# 139	Wk #140
		CA10080-MAR10	CA10124-MAR10	CA10003-APR10	CA10030-APR10	CA11072-APR10	CA11096-APR10	CA10003-MAY10	CA10029-MAY10	CA10054-MAY10	CA10079-MAY10	CA10003-JUN10
		23-Mar-10	30-Mar-10	06-Apr-10	13-Apr-10	20-Apr-10	27-Apr-10	04-May-10	11-May-10	18-May-10	25-May-10	01-Jun-10
Leachate Volume Added	mL	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Leachate Volume Recovered	mL	838	884	962	859	844	841	835	905	839	840	843
pH	-	7.37	7.46	7.59	7.33	7.40	7.53	7.26	7.31	7.46	7.43	7.43
Acidity	mg/L as CaCO3	13	26	3	18	20	19	22	25	12	18	12
Alkalinity	mg/L as CaCO3	15	12	16	11	11	14	13	12	15	15	15
Conductivity	µS/cm	126	129	131	125	141	141	154	144	135	151	142
Sulphate	mg/L	28	28	34	29	37	40	40	36	31	38	35
Calcium (Ca)	mg/L	21.9	21.7	22.3	22.3	24.1	25.4	25.6	24.3	21.5	26.7	23.9
Iron (Fe)	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.002	< 0.002	< 0.01
Silver (Ag)	mg/L	0.00003					0.00003					0.00008
Aluminum (Al)	mg/L	< 0.01					< 0.01					0.01
Arsenic (As)	mg/L	0.0004					0.0011					0.0021
Barium (Ba)	mg/L	0.00637					0.00823					0.00736
Beryllium (Be)	mg/L	< 0.00002					< 0.00002					< 0.00002
Boron (B)	mg/L	0.0004					0.0003					0.0006
Bismuth (Bi)	mg/L	0.00002					0.00003					0.00003
Cadmium (Cd)	mg/L	0.000007					0.000024					0.000023
Cobalt (Co)	mg/L	0.00369					0.00508					0.00527
Chromium (Cr)	mg/L	< 0.0005					< 0.0005					< 0.0005
Copper (Cu)	mg/L	0.0396					0.0421					0.0366
Potassium (K)	mg/L	0.50					0.57					0.46
Lithium (Li)	mg/L	< 0.001					< 0.001					< 0.001
Magnesium (Mg)	mg/L	0.792					0.900					0.729
Manganese (Mn)	mg/L	0.0583					0.0841					0.0766
Molybdenum (Mo)	mg/L	0.00010					0.00010					0.00012
Nickel (Ni)	mg/L	0.0162					0.0195					0.0215
Lead (Pb)	mg/L	0.00013					0.00082					0.00038
Antimony (Sb)	mg/L	< 0.0002					0.0002					0.0003
Selenium (Se)	mg/L	< 0.001					< 0.001					< 0.001
Tin (Sn)	mg/L	0.00011					0.00015					0.00009
Strontium (Sr)	mg/L	0.0610					0.0726					0.0634
Titanium (Ti)	mg/L	< 0.0001					0.0002					< 0.0001
Thallium (Tl)	mg/L	< 0.0002					< 0.0002					< 0.0002
Uranium (U)	mg/L	0.000002					< 0.000001					0.000005
Vanadium (V)	mg/L	< 0.00003					< 0.00003					0.00004
Tungsten (W)	mg/L	< 0.00003					< 0.00003					< 0.00003
Yttrium (Y)	mg/L	< 0.000001					0.000002					0.000005
Zinc (Zn)	mg/L	0.001					0.002					0.001

Week#0 signifies the initial flooding of the humidity cell initiating the 20 week test period.

Humidity Cell Results from Sample MAR07-15

Analyte	Unit	Wk # 141	Wk #142	Wk #143	Wk # 144	Wk # 145	Wk #146	Wk #147	Wk #148
		CA10028-JUN10	CA10066-JUN10	CA10078-JUN10	CA10182-JUN10	CA10002-JUL10	CA10038-JUL10	CA10064-JUL10	CA11318-JUL10
		08-June-10	15-Jun-10	22-Jun-10	29-June-10	06-Jul-10	13-Jul-10	21-Jul-10	27-Jul-10
Leachate Volume Added	mL	1000	1000	1000	1000	1000	1000	1000	1000
Leachate Volume Recovered	mL	834	839	875	851	963	942	930	969
pH	-	7.42	7.47	7.35	7.34	7.53	7.71	7.37	7.60
Acidity	mg/L as CaCO3	11	8	< 2	16	< 2	3	10	< 2
Alkalinity	mg/L as CaCO3	18	16	12	13	18	18	16	22
Conductivity	µS/cm	153	139	143	143	152	137	129	143
Sulphate	mg/L	37	33	36	35	39	35	29	34
Calcium (Ca)	mg/L	26.8	23.7	23.8	23.3	28.6	20.7	20.2	24.1
Iron (Fe)	mg/L	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Silver (Ag)	mg/L					0.00028			< 0.00001
Aluminum (Al)	mg/L					0.02			< 0.01
Arsenic (As)	mg/L					0.0008			< 0.0002
Barium (Ba)	mg/L					0.00700			0.0092
Beryllium (Be)	mg/L					< 0.00002			< 0.00002
Boron (B)	mg/L					0.0003			0.0005
Bismuth (Bi)	mg/L					< 0.00001			< 0.00001
Cadmium (Cd)	mg/L					0.000023			0.000395
Cobalt (Co)	mg/L					0.00450			0.00414
Chromium (Cr)	mg/L					< 0.0005			< 0.0005
Copper (Cu)	mg/L					0.0140			0.0165
Potassium (K)	mg/L					0.432			0.378
Lithium (Li)	mg/L					< 0.001			< 0.001
Magnesium (Mg)	mg/L					0.798			0.688
Manganese (Mn)	mg/L					0.0759			0.0712
Molybdenum (Mo)	mg/L					0.00010			0.00009
Nickel (Ni)	mg/L					0.0163			0.0146
Lead (Pb)	mg/L					< 0.00002			0.00014
Antimony (Sb)	mg/L					< 0.0002			0.0009
Selenium (Se)	mg/L					< 0.001			< 0.001
Tin (Sn)	mg/L					0.00009			0.00057
Strontium (Sr)	mg/L					0.0689			0.0604
Titanium (Ti)	mg/L					< 0.0001			< 0.0001
Thallium (Tl)	mg/L					< 0.0002			< 0.0002
Uranium (U)	mg/L					0.000004			0.000001
Vanadium (V)	mg/L					0.00004			< 0.00003
Tungsten (W)	mg/L					< 0.00003			< 0.00003
Yttrium (Y)	mg/L					0.000003			0.000001
Zinc (Zn)	mg/L					0.002			< 0.002

Week#0 signifies the initial flooding of the humidity cell initiating the 20 week test period.

Humidity Cell Results from Sample MAR07-96

Analyte	Unit	Wk#0	Wk#1	Wk#2	Wk#3	Wk#4	Wk#5	Wk#6	Wk#7	Wk#8	Wk#9	Wk#10
		CA10583-SEP07	CA10037-OCT07	CA10252-OCT07	CA10377-OCT07	CA10615-OCT07	CA10756-OCT07	CA10043-NOV07	CA10244-NOV07	CA10377-NOV07	CA10610-NOV07	CA10008-DEC07
		25-Sep-07	02-Oct-07	09-Oct-07	16-Oct-07	23-Oct-07	30-Oct-07	06-Nov-07	13-Nov-07	20-Nov-07	27-Nov-07	04-Dec-07
Leachate Volume Added	mL	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Leachate Volume Recovered	mL	844	975	982	991	905	926	952	876	890	NA	878
pH	-	7.33	7.34	7.71	7.21	7.47	7.08	7.2	7.16	7.06	6.96	6.92
Acidity	mg/L as CaCO3	< 2	28	14	8	41	50	48	53	57	54	36
Alkalinity	mg/L as CaCO3	12	13	14	13	8	7	7	7	5	5	5
Conductivity	µS/cm	143	328	233	143	124	110	109	135	122	100	94
Sulphate	mg/L	39	100	69	31	24	14	13	15	10	9	9.4
Calcium (Ca)	mg/L	12.7	29.9	21.0	11.2	11.8	11.9	11.6	15.8	13.1	11.4	12
Iron (Fe)	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Silver (Ag)	mg/L	0.00006	< 0.00001	< 0.00001			< 0.00001					0.00002
Aluminum (Al)	mg/L	0.04	0.05	0.06			0.03					0.03
Arsenic (As)	mg/L	< 0.0002	0.0003	0.0004			< 0.0002					< 0.0002
Barium (Ba)	mg/L	0.00320	0.00711	0.00516			0.00274					0.00325
Beryllium (Be)	mg/L	< 0.00002	< 0.00002	< 0.00002			< 0.00002					< 0.00002
Boron (B)	mg/L	0.0041	0.0112	0.0104			0.0040					0.0019
Bismuth (Bi)	mg/L	0.00001	< 0.00001	< 0.00001			< 0.00001					< 0.00001
Cadmium (Cd)	mg/L	< 0.000003	< 0.000003	< 0.000003			< 0.000003					0.000003
Cobalt (Co)	mg/L	0.000110	0.000167	0.000088			0.000024					0.000147
Chromium (Cr)	mg/L	< 0.0005	< 0.0005	< 0.0005			< 0.0005					< 0.0005
Copper (Cu)	mg/L	0.0005	0.0007	0.0006			0.0019					0.0103
Potassium (K)	mg/L	2.13	5.26	4.90			2.41					2.29
Lithium (Li)	mg/L	0.0054	0.0083	0.0074			0.0054					0.0035
Magnesium (Mg)	mg/L	0.771	2.47	1.78			0.961					0.906
Manganese (Mn)	mg/L	0.00898	0.0141	0.0118			0.0133					0.0118
Molybdenum (Mo)	mg/L	0.00094	0.00188	0.00150			0.00130					0.00029
Nickel (Ni)	mg/L	0.0015	0.0014	0.0007			0.0005					0.0005
Lead (Pb)	mg/L	< 0.00002	0.00018	0.00036			0.00004					0.00003
Antimony (Sb)	mg/L	0.00036	0.00031	0.00037			0.00028					0.00017
Selenium (Se)	mg/L	< 0.001	< 0.001	< 0.001			< 0.001					< 0.001
Tin (Sn)	mg/L	0.0116	0.00613	0.00332			0.00125					0.0005
Strontium (Sr)	mg/L	0.108	0.285	0.191			0.104					0.0964
Titanium (Ti)	mg/L	< 0.0001	< 0.0001	< 0.0001			< 0.0001					< 0.0001
Thallium (Tl)	mg/L	< 0.00001	< 0.00001	< 0.00001			< 0.00001					< 0.000002
Uranium (U)	mg/L	0.000016	0.000213	0.000205			0.000044					0.000019
Vanadium (V)	mg/L	0.00025	0.00039	0.00037			0.00015					0.00011
Tungsten (W)	mg/L	0.00014	0.00016	0.00010			0.00007					< 0.00003
Yttrium (Y)	mg/L	0.000002	0.000005	0.000004			0.000003					0.000003
Zinc (Zn)	mg/L	0.001	0.003	0.003			0.005					0.003

Week#0 signifies the initial flooding of the humidity cell initiating the 20 week test period.

Humidity Cell Results from Sample MAR07-96

Analyte	Unit	Wk#11	Wk#12	Wk#13	Wk#14	Wk#15	Wk#16	Wk#17	Wk#18	Wk#19	Wk#20	Wk#21
		CA10163-DEC07	CA10307-DEC07	CA10483-DEC07	CA10001-JAN08	CA10088-JAN08	CA10221-JAN08	CA10366-JAN08	CA10526-JAN08	CA10012-FEB08	CA10179-FEB08	CA10305-FEB08
		11-Dec-07	19-Dec-07	24-Dec-07	02-Jan-08	08-Jan-08	16-Jan-08	22-Jan-08	29-Jan-08	05-Feb-08	12-Feb-08	19-Feb-08
Leachate Volume Added	mL	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Leachate Volume Recovered	mL	991	975	943	953	941	945	942	957	945	919	949
pH	-	6.86	6.83	6.78	7.1	7.12	6.19	6.86	7.18	6.97	6.82	6.9
Acidity	mg/L as CaCO3	51	29	25	31	19	34	363	36	26	27	6
Alkalinity	mg/L as CaCO3	12	9	6	9	5	3	5	6	5	4	4
Conductivity	µS/cm	130	77	57	96	66	77	63	87	68	65	85
Sulphate	mg/L	21	13	7.6	12	7.9	10	9.3	12	9.6	9	12
Calcium (Ca)	mg/L	16.3	11.8	6.18	12.7	8.23	8.92	8.34	12.1	9.34	8.55	12.7
Iron (Fe)	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Silver (Ag)	mg/L					0.00001					0.00001	
Aluminum (Al)	mg/L					0.04					0.04	
Arsenic (As)	mg/L					< 0.0002					< 0.0002	
Barium (Ba)	mg/L					0.00165					0.00157	
Beryllium (Be)	mg/L					< 0.00002					< 0.00002	
Boron (B)	mg/L					0.0016					0.0004	
Bismuth (Bi)	mg/L					< 0.00001					< 0.00001	
Cadmium (Cd)	mg/L					< 0.000003					< 0.000003	
Cobalt (Co)	mg/L					0.00007					0.00009	
Chromium (Cr)	mg/L					< 0.0005					< 0.0005	
Copper (Cu)	mg/L					0.0016					0.0047	
Potassium (K)	mg/L					1.67					1.41	
Lithium (Li)	mg/L					0.004					0.002	
Magnesium (Mg)	mg/L					0.473					0.458	
Manganese (Mn)	mg/L					0.00863					0.00816	
Molybdenum (Mo)	mg/L					0.00016					0.00012	
Nickel (Ni)	mg/L					< 0.0001					0.0003	
Lead (Pb)	mg/L					< 0.00002					< 0.00002	
Antimony (Sb)	mg/L					0.00007					0.00021	
Selenium (Se)	mg/L					< 0.001					< 0.001	
Tin (Sn)	mg/L					0.00025					0.00015	
Strontium (Sr)	mg/L					0.0522					0.0489	
Titanium (Ti)	mg/L					< 0.0001					< 0.0001	
Thallium (Tl)	mg/L					< 0.000002					< 0.000002	
Uranium (U)	mg/L					0.00002					0.000106	
Vanadium (V)	mg/L					0.00011					< 0.00003	
Tungsten (W)	mg/L					< 0.00003					< 0.00003	
Yttrium (Y)	mg/L					< 0.000001					0.000005	
Zinc (Zn)	mg/L					< 0.001					0.002	

Week#0 signifies the initial flooding of the humidity cell initiating the 20 week test period.

Humidity Cell Results from Sample MAR07-96

Analyte	Unit	Wk#22	Wk#23	Wk#24	Wk#25	Wk#26	Wk#27	Wk#28	Wk#29	Wk#30	Wk#31
		CA10425-FEB08	CA10014-MAR08	CA10155-MAR08	CA10275-MAR08	CA10378-MAR08	CA10017-APR08	CA10186-APR08	CA10299-APR08	CA10503-APR08	CA10616-APR08
		26-Feb-08	04-Mar-08	11-Mar-08	18-Mar-08	25-Mar-08	01-Apr-08	08-Apr-08	15-Apr-08	22-Apr-08	29-Apr-08
Leachate Volume Added	mL	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Leachate Volume Recovered	mL	919	924	939	931	937	945	943	882	902	949
pH	-	6.9	7.35	7.03	6.7	6.84	5.90	6.49	5.86	6.49	6.81
Acidity	mg/L as CaCO3	23	40	42	32	28	19	32	34	42	28
Alkalinity	mg/L as CaCO3	4	9	6	4	5	< 2	3	< 2	3	4
Conductivity	µS/cm	89	104	101	71	69	71	79	80	95	83
Sulphate	mg/L	10	15	18	13	12	12	15	13	16	16
Calcium (Ca)	mg/L	10.7	14.8	14.9	10.7	9.63	11.8	11.7	10.6	12.4	12.1
Iron (Fe)	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.01	< 0.01	< 0.01	< 0.01
Silver (Ag)	mg/L				< 0.00001					< 0.00001	
Aluminum (Al)	mg/L				0.04					0.02	
Arsenic (As)	mg/L				< 0.0002					0.0003	
Barium (Ba)	mg/L				0.00235					0.00266	
Beryllium (Be)	mg/L				< 0.00002					< 0.00002	
Boron (B)	mg/L				0.0009					0.0005	
Bismuth (Bi)	mg/L				< 0.00001					< 0.00001	
Cadmium (Cd)	mg/L				< 0.000003					< 0.000003	
Cobalt (Co)	mg/L				0.000231					0.000215	
Chromium (Cr)	mg/L				< 0.0005					< 0.0005	
Copper (Cu)	mg/L				0.0018					0.0045	
Potassium (K)	mg/L				1.5					1.53	
Lithium (Li)	mg/L				0.005					0.003	
Magnesium (Mg)	mg/L				0.454					0.448	
Manganese (Mn)	mg/L				0.014					0.0136	
Molybdenum (Mo)	mg/L				0.00012					0.00016	
Nickel (Ni)	mg/L				0.0006					0.0004	
Lead (Pb)	mg/L				0.00007					< 0.00002	
Antimony (Sb)	mg/L				0.00019					0.00006	
Selenium (Se)	mg/L				< 0.001					< 0.001	
Tin (Sn)	mg/L				0.00035					0.00029	
Strontium (Sr)	mg/L				0.0528					0.0546	
Titanium (Ti)	mg/L				0.0001					< 0.0001	
Thallium (Tl)	mg/L				< 0.000002					< 0.000002	
Uranium (U)	mg/L				0.000008					0.000019	
Vanadium (V)	mg/L				0.0001					0.00005	
Tungsten (W)	mg/L				0.00007					< 0.00003	
Yttrium (Y)	mg/L				0.000001					0.000002	
Zinc (Zn)	mg/L				0.004					0.004	

Week#0 signifies the initial flooding of the humidity cell initiating the 20 week test period.

Humidity Cell Results from Sample MAR07-96

Analyte	Unit	Wk#32	Wk#33	Wk#34	Wk#35	Wk#36	Wk#37	Wk#38	Wk#39	Wk#40	Wk#41	Wk#42
		CA10074-MAY08	CA10110-MAY08	CA10136-MAY08	CA10666-MAY08	CA10007-JUN08	CA10038-JUN08	CA10088-JUN08	CA10368-JUN08	CA10009-JUL08	CA10036-JUL08	CA10113-JUL08
		06-May-08	13-May-08	20-May-08	27-May-08	03-Jun-08	10-Jun-08	17-Jun-08	24-Jun-08	01-Jul-08	08-Jul-08	15-Jul-08
Leachate Volume Added	mL	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Leachate Volume Recovered	mL	851	892	893	867	896	911	965	973	945	973	913
pH	-	6.87	5.83	5.84	6.90	6.93	6.79	7.13	7.11	6.9	7.11	6.53
Acidity	mg/L as CaCO3	30	28	46	30	28	31	< 2	21	12	< 2	15
Alkalinity	mg/L as CaCO3	3	< 2	< 2	4	5	6	9	9	6	14	4
Conductivity	µS/cm	85	67	100	84	72	84	109	97	75	113	62
Sulphate	mg/L	15	9.5	13	13	13	16	23	23	16	23	15
Calcium (Ca)	mg/L	11.5	8.71	13.7	11.5	10.3	13.3	17.8	17.4	11.2	16.9	9.23
Iron (Fe)	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Silver (Ag)	mg/L				0.00001					< 0.00001		
Aluminum (Al)	mg/L				0.02					0.01		
Arsenic (As)	mg/L				< 0.0002					0.0002		
Barium (Ba)	mg/L				0.00238					0.00211		
Beryllium (Be)	mg/L				< 0.00002					< 0.00002		
Boron (B)	mg/L				0.0009					0.0009		
Bismuth (Bi)	mg/L				0.00001					< 0.00001		
Cadmium (Cd)	mg/L				< 0.000003					0.000003		
Cobalt (Co)	mg/L				0.000133					0.000168		
Chromium (Cr)	mg/L				< 0.0005					< 0.0005		
Copper (Cu)	mg/L				0.0053					0.0029		
Potassium (K)	mg/L				1.53					1.26		
Lithium (Li)	mg/L				0.004					0.004		
Magnesium (Mg)	mg/L				0.397					0.301		
Manganese (Mn)	mg/L				0.0123					0.0166		
Molybdenum (Mo)	mg/L				0.0001					0.00013		
Nickel (Ni)	mg/L				0.0003					0.0006		
Lead (Pb)	mg/L				0.00004					< 0.00002		
Antimony (Sb)	mg/L				0.00009					0.00016		
Selenium (Se)	mg/L				< 0.001					< 0.001		
Tin (Sn)	mg/L				0.00027					0.00017		
Strontium (Sr)	mg/L				0.0478					0.0411		
Titanium (Ti)	mg/L				< 0.0001					< 0.0001		
Thallium (Tl)	mg/L				0.000016					< 0.000002		
Uranium (U)	mg/L				0.000015					0.000017		
Vanadium (V)	mg/L				0.00017					< 0.00003		
Tungsten (W)	mg/L				< 0.00003					< 0.00003		
Yttrium (Y)	mg/L				0.000002					0.000003		
Zinc (Zn)	mg/L				0.003					0.003		

Week#0 signifies the initial flooding of the humidity cell initiating the 20 week test period.

Humidity Cell Results from Sample MAR07-96

Analyte	Unit	Wk#43	Wk#44	Wk#45	Wk#46	Wk#47	Wk#48	Wk #49	Wk #50	Wk #51	Wk #52	Wk #53
		CA10139-JUL08	CA10444-JUL08	CA10009-AUG08	CA10035-AUG08	CA10417-AUG08	CA10490-AUG08	CA10007-SEP08	CA10035-SEP08	CA10199-SEP08	CA10453-SEP08	CA10613-SEP08
		22-Jul-08	29-Jul-08	05-Aug-08	12-Aug-08	19-Aug-08	26-Aug-08	02-Sep-08	09-Sep-08	16-Sep-08	23-Sep-08	30-Sep-08
Leachate Volume Added	mL	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Leachate Volume Recovered	mL	928	926	944	910	857	878	948	863	920	915	937
pH	-	6.48	6.58	6.78	7.06	6.7	6.5	6.8	7.15	6.85	6.94	7.13
Acidity	mg/L as CaCO3	26	14	24	26	30	31	34	29	27	30	38
Alkalinity	mg/L as CaCO3	5	4	4	5	4	3	5	17	7	6	9
Conductivity	µS/cm	78	66	87	111	108	72	102	103	97	86	106
Sulphate	mg/L	16	13	18	17	15	15	21	19	17	16	22
Calcium (Ca)	mg/L	11.6	9.68	12.5	12.8	12.1	10.5	7.96	17.9	14.1	13.7	17.6
Iron (Fe)	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Silver (Ag)	mg/L			< 0.00001					< 0.00001			
Aluminum (Al)	mg/L			0.02					0.04			
Arsenic (As)	mg/L			< 0.0002					0.0006			
Barium (Ba)	mg/L			0.00221					0.0034			
Beryllium (Be)	mg/L			< 0.00002					< 0.00002			
Boron (B)	mg/L			0.0004					0.0008			
Bismuth (Bi)	mg/L			< 0.00001					0.00001			
Cadmium (Cd)	mg/L			< 0.000003					< 0.000003			
Cobalt (Co)	mg/L			0.000264					0.000324			
Chromium (Cr)	mg/L			< 0.0005					< 0.0005			
Copper (Cu)	mg/L			0.0026					0.0042			
Potassium (K)	mg/L			1.17					1.97			
Lithium (Li)	mg/L			0.003					0.006			
Magnesium (Mg)	mg/L			0.292					0.44			
Manganese (Mn)	mg/L			0.0201					0.0251			
Molybdenum (Mo)	mg/L			0.00007					0.00012			
Nickel (Ni)	mg/L			0.0007					0.0007			
Lead (Pb)	mg/L			< 0.00002					< 0.00002			
Antimony (Sb)	mg/L			0.00015					0.00008			
Selenium (Se)	mg/L			< 0.001					< 0.001			
Tin (Sn)	mg/L			0.00012					0.00012			
Strontium (Sr)	mg/L			0.0425					0.0573			
Titanium (Ti)	mg/L			< 0.0001					< 0.0001			
Thallium (Tl)	mg/L			< 0.000002					< 0.000002			
Uranium (U)	mg/L			0.00002					0.000244			
Vanadium (V)	mg/L			0.00022					0.00005			
Tungsten (W)	mg/L			< 0.00003					< 0.00003			
Yttrium (Y)	mg/L			0.000004					0.000002			
Zinc (Zn)	mg/L			0.002					0.003			

Week#0 signifies the initial flooding of the humidity cell initiating the 20 week test period.

Humidity Cell Results from Sample MAR07-96

Analyte	Unit	Wk #54	Wk #55	Wk #56	Wk #57	Wk#58	Wk#59	Wk#60	Wk#61	Wk#62	Wk#63	Wk#64
		CA10093-OCT08	CA10259-OCT08	CA10456-OCT08	CA10647-OCT08	CA10006-NOV08	CA10046-NOV08	CA10232-NOV08	CA10409-NOV08	CA10012-DEC08	CA10041-DEC08	CA10126-DEC08
		07-Oct-08	14-Oct-08	21-Oct-08	28-Oct-08	04-Nov-08	11-Nov-08	18-Nov-08	25-Nov-08	02-Dec-08	09-Dec-08	16-Dec-08
Leachate Volume Added	mL	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Leachate Volume Recovered	mL	950	938	963	878	853	878	870	900	940	903	913
pH	-	7.26	6.94	7.23	7.05	6.98	6.9	7.12	6.85	7.05	7.02	6.90
Acidity	mg/L as CaCO3	27	18	23	16	37	33	38	38	40	37	25
Alkalinity	mg/L as CaCO3	14	82	13	6	6	6	6	5	8	6	5
Conductivity	µS/cm	119	75	118	80	100	82	98	86	126	103	86
Sulphate	mg/L	25	13	24	13	16	15	17	17	25	18	18
Calcium (Ca)	mg/L	19.6	11.7	19.4	11.1	15.3	13.7	15.3	14.7	20.1	16.3	14.8
Iron (Fe)	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Silver (Ag)	mg/L		< 0.00001					< 0.00001				
Aluminum (Al)	mg/L		0.03					0.04				
Arsenic (As)	mg/L		< 0.0002					< 0.0002				
Barium (Ba)	mg/L		0.00186					0.00295				
Beryllium (Be)	mg/L		< 0.00002					< 0.00002				
Boron (B)	mg/L		0.0002					0.0005				
Bismuth (Bi)	mg/L		< 0.00001					< 0.00001				
Cadmium (Cd)	mg/L		< 0.000003					< 0.000003				
Cobalt (Co)	mg/L		0.000257					0.000304				
Chromium (Cr)	mg/L		< 0.0005					< 0.0005				
Copper (Cu)	mg/L		0.0019					0.0052				
Potassium (K)	mg/L		1.22					1.4				
Lithium (Li)	mg/L		0.004					0.004				
Magnesium (Mg)	mg/L		0.24					0.312				
Manganese (Mn)	mg/L		0.0238					0.0216				
Molybdenum (Mo)	mg/L		0.00014					0.00008				
Nickel (Ni)	mg/L		0.0009					0.0008				
Lead (Pb)	mg/L		< 0.00002					0.00003				
Antimony (Sb)	mg/L		0.00018					< 0.0002				
Selenium (Se)	mg/L		< 0.001					< 0.001				
Tin (Sn)	mg/L		0.00015					0.00011				
Strontium (Sr)	mg/L		0.0331					0.0426				
Titanium (Ti)	mg/L		0.0001					< 0.0001				
Thallium (Tl)	mg/L		< 0.000002					0.000003				
Uranium (U)	mg/L		0.000013					0.000016				
Vanadium (V)	mg/L		< 0.00003					< 0.00003				
Tungsten (W)	mg/L		< 0.00003					< 0.00003				
Yttrium (Y)	mg/L		< 0.000001					0.000001				
Zinc (Zn)	mg/L		0.002					0.002				

Week#0 signifies the initial flooding of the humidity cell initiating the 20 week test period.

Humidity Cell Results from Sample MAR07-96

Analyte	Unit	Wk#65	Wk#66	Wk#67	Wk#68	Wk#69	Wk#70	Wk#71	Wk#72	Wk#73	Wk#74	Wk#75
		CA10269-DEC08	CA10504-DEC08	CA10012-JAN09	CA10043-JAN09	CA10135-JAN-09	CA10182-JAN-09	CA10010-FEB09	CA10036-FEB09	CA10061-FEB09	CA10106-FEB09	CA10045-MAR09
		23-Dec-08	29-Dec-08	06-Jan-09	13-Jan-09	20-Jan-09	27-Jan-09	03-Feb-09	10-Feb-09	17-Feb-09	24-Feb-09	03-Mar-09
Leachate Volume Added	mL	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Leachate Volume Recovered	mL	922	897	915	917	913	892	874	848	844	847	872
pH	-	6.92	6.9	6.95	7.86	7.3	6.98	6.98	6.85	6.84	7.02	6.65
Acidity	mg/L as CaCO3	32	44	49	< 2	39	27	38	43	51	46	50
Alkalinity	mg/L as CaCO3	5	6	7	12	8	5	5	5	5	6	4
Conductivity	µS/cm	79	107	122	109	116	72	92	111	123	124	131
Sulphate	mg/L	17	20	25	19	23	15	17	20	27	27	31
Calcium (Ca)	mg/L	13.3	17.2	20.2	16.7	19.2	12.9	16.5	16.5	21	20.8	20.2
Iron (Fe)	mg/L	< 0.01	< 0.01	0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Silver (Ag)	mg/L	< 0.00001					< 0.00001					< 0.00001
Aluminum (Al)	mg/L	0.03					0.02					< 0.01
Arsenic (As)	mg/L	< 0.0002					0.0002					< 0.0002
Barium (Ba)	mg/L	0.00247					0.00226					0.00386
Beryllium (Be)	mg/L	< 0.00002					< 0.00002					< 0.00002
Boron (B)	mg/L	< 0.0002					0.0004					0.0014
Bismuth (Bi)	mg/L	< 0.00001					< 0.00001					< 0.00001
Cadmium (Cd)	mg/L	< 0.000003					< 0.000003					< 0.000003
Cobalt (Co)	mg/L	0.000335					0.000401					0.000697
Chromium (Cr)	mg/L	< 0.0005					< 0.0005					< 0.0005
Copper (Cu)	mg/L	0.0035					0.0022					0.0044
Potassium (K)	mg/L	1.02					1.06					1.36
Lithium (Li)	mg/L	0.003					0.003					0.003
Magnesium (Mg)	mg/L	0.231					0.216					0.354
Manganese (Mn)	mg/L	0.02112					0.0211					0.03925
Molybdenum (Mo)	mg/L	< 0.00001					0.00006					0.0001
Nickel (Ni)	mg/L	0.0009					0.0009					0.0029
Lead (Pb)	mg/L	< 0.00002					< 0.00002					< 0.00002
Antimony (Sb)	mg/L	< 0.0002					0.0002					0.0003
Selenium (Se)	mg/L	< 0.001					< 0.001					< 0.001
Tin (Sn)	mg/L	0.00006					0.00025					0.00021
Strontium (Sr)	mg/L	0.0332					0.03					0.0444
Titanium (Ti)	mg/L	0.0002					< 0.0001					< 0.0001
Thallium (Tl)	mg/L	0.000003					0.000003					0.000004
Uranium (U)	mg/L	0.000091					0.00004					0.00005
Vanadium (V)	mg/L	< 0.00003					< 0.00003					0.00003
Tungsten (W)	mg/L	< 0.00003					< 0.00003					0.00004
Yttrium (Y)	mg/L	0.000002					0.000002					0.000003
Zinc (Zn)	mg/L	0.001					< 0.001					0.002

Week#0 signifies the initial flooding of the humidity cell initiating the 20 week test period.

Humidity Cell Results from Sample MAR07-96

Analyte	Unit	Wk#76	Wk#77	Wk#78	Wk#79	Wk#80	Wk#81	Wk#82	Wk#83	Wk#84	Wk#85
		CA10009-MAR09	CA10057-MAR09	CA11117-MAR09	CA11275-MAR09	CA10022-APR09	CA10083-APR09	CA10058-APR09	CA11220-APR09	CA10006-MAY09	CA10025-MAY09
		10-Mar-09	17-Mar-09	24-Mar-09	31-Mar-09	07-Apr-09	14-Apr-09	21-Apr-09	28-Apr-09	05-May-09	12-May-09
Leachate Volume Added	mL	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Leachate Volume Recovered	mL	847	843	851	852	869	939	840	838	891	842
pH	-	6.79	6.66	6.77	6.75	6.90	7.12	7.10	6.96	7.15	7.08
Acidity	mg/L as CaCO3	46	43	42	64	53	48	44	56	54	30
Alkalinity	mg/L as CaCO3	5	4	3	3	5	7	7	5	8	7
Conductivity	µS/cm	127	137	100	132	139	134	127	154	168	102
Sulphate	mg/L	25	27	21	27	27	29	26	29	39	22
Calcium (Ca)	mg/L	20.2	20.3	15.3	20.1	21.6	22.1	19.6	26.8	28.9	17.6
Iron (Fe)	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Silver (Ag)	mg/L					0.00006					0.00005
Aluminum (Al)	mg/L					< 0.01					0.01
Arsenic (As)	mg/L					< 0.0002					< 0.0002
Barium (Ba)	mg/L					0.00428					0.00315
Beryllium (Be)	mg/L					< 0.00002					0.00003
Boron (B)	mg/L					0.0004					0.0006
Bismuth (Bi)	mg/L					< 0.00001					0.00003
Cadmium (Cd)	mg/L					< 0.000003					0.000022
Cobalt (Co)	mg/L					0.000865					0.000777
Chromium (Cr)	mg/L					< 0.0005					< 0.0005
Copper (Cu)	mg/L					0.0043					0.0035
Potassium (K)	mg/L					1.44					1.53
Lithium (Li)	mg/L					0.004					0.004
Magnesium (Mg)	mg/L					0.41					0.324
Manganese (Mn)	mg/L					0.0469					0.0393
Molybdenum (Mo)	mg/L					0.00008					0.00006
Nickel (Ni)	mg/L					0.0033					0.0034
Lead (Pb)	mg/L					0.00009					0.00011
Antimony (Sb)	mg/L					< 0.0002					< 0.0002
Selenium (Se)	mg/L					< 0.001					< 0.001
Tin (Sn)	mg/L					0.00016					0.00015
Strontium (Sr)	mg/L					0.0462					0.0324
Titanium (Ti)	mg/L					0.0003					0.0003
Thallium (Tl)	mg/L					< 0.0002					< 0.0002
Uranium (U)	mg/L					0.000305					0.00003
Vanadium (V)	mg/L					< 0.00003					0.00005
Tungsten (W)	mg/L					< 0.00003					< 0.00003
Yttrium (Y)	mg/L					< 0.000001					0.000017
Zinc (Zn)	mg/L					0.002					< 0.001

Week#0 signifies the initial flooding of the humidity cell initiating the 20 week test period.

Humidity Cell Results from Sample MAR07-96

Analyte	Unit	Wk#86	Wk#87	Wk#88	Wk#89	Wk#90	Wk#91	Wk#92	Wk#93	Wk#94	Wk#95	Wk#96
		CA10055-MAY09	CA11098-MAY09	CA10006-JUN09	CA10024-JUN09	CA10042-JUN09	CA11088-JUN09	CA11138-JUN09	CA10004-JUL09	CA10022-JUL09	CA10041-JUL09	CA11071-JUL09
		19-May-09	26-May-09	02-Jun-09	09-Jun-09	16-Jun-09	23-Jun-09	30-Jun-09	07-Jul-09	14-Jul-09	21-Jul-09	28-Jul-09
Leachate Volume Added	mL	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Leachate Volume Recovered	mL	847	847	846	843	843	847	845	890	870	870	853
pH	-	6.46	7.20	7.00	6.90	6.75	6.78	7.25	6.81	6.82	6.55	6.59
Acidity	mg/L as CaCO3	39	53	47	45	42	57	50	44	52	59	42
Alkalinity	mg/L as CaCO3	2	8	6	4	4	4	9	4	4	4	6
Conductivity	µS/cm	96	140	140	111	105	126	154	132	50	125	172
Sulphate	mg/L	20	32	29	26	23	26	32	29	25	24	32
Calcium (Ca)	mg/L	14.8	25	21.9	18.4	17.6	20.3	24	21.1	19.4	20.3	23.7
Iron (Fe)	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Silver (Ag)	mg/L					< 0.00001					< 0.00001	
Aluminum (Al)	mg/L					0.01					0.01	
Arsenic (As)	mg/L					0.0006					< 0.0002	
Barium (Ba)	mg/L					0.00333					0.00443	
Beryllium (Be)	mg/L					< 0.00002					< 0.00002	
Boron (B)	mg/L					0.0005					0.0007	
Bismuth (Bi)	mg/L					< 0.00001					0.00005	
Cadmium (Cd)	mg/L					0.000005					< 0.000003	
Cobalt (Co)	mg/L					0.0011					0.00157	
Chromium (Cr)	mg/L					< 0.0005					< 0.0005	
Copper (Cu)	mg/L					0.0036					0.0041	
Potassium (K)	mg/L					1.43					1.58	
Lithium (Li)	mg/L					0.004					0.005	
Magnesium (Mg)	mg/L					0.368					0.455	
Manganese (Mn)	mg/L					0.046					0.063	
Molybdenum (Mo)	mg/L					0.00004					0.00004	
Nickel (Ni)	mg/L					0.0049					0.0058	
Lead (Pb)	mg/L					< 0.00002					0.00022	
Antimony (Sb)	mg/L					< 0.0002					0.0002	
Selenium (Se)	mg/L					< 0.001					< 0.001	
Tin (Sn)	mg/L					0.00011					0.00024	
Strontium (Sr)	mg/L					0.0321					0.0363	
Titanium (Ti)	mg/L					0.0003					0.0004	
Thallium (Tl)	mg/L					< 0.0002					< 0.0002	
Uranium (U)	mg/L					0.000003					0.000002	
Vanadium (V)	mg/L					< 0.00003					< 0.00003	
Tungsten (W)	mg/L					< 0.00003					< 0.00003	
Yttrium (Y)	mg/L					0.000002					0.000003	
Zinc (Zn)	mg/L					0.001					0.002	

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Humidity Cell Results from Sample MAR07-96

Analyte	Unit	Wk#97	Wk#98	Wk#99	Wk#100	Wk#101	Wk#102	Wk#103	Wk#104	Wk#105	Wk#106	Wk#107
		CA10003-AUG09	CA10035-AUG09	CA10162-AUG09	CA10179-AUG09	CA10002-SEP09	CA10019-SEP09	CA10036-SEP09	CA10151-SEP09	CA11058-SEP09	CA10014-OCT09	CA11047-OCT09
		04-Aug-09	11-Aug-09	18-Aug-09	25-Aug-09	01-Sep-09	08-Sep-09	15-Sep-09	22-Sep-09	29-Sep-09	06-Oct-09	13-Oct-09
Leachate Volume Added	mL	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Leachate Volume Recovered	mL	844	845	848	843	954	855	885	834	914	877	924
pH	-	6.84	6.58	6.81	6.84	6.61	6.59	6.65	7.03	7.21	7.06	7.10
Acidity	mg/L as CaCO3	57	54	59	44	36	51	58	54	47	43	41
Alkalinity	mg/L as CaCO3	5	5	7	7	10	5	5	7	9	7	7
Conductivity	µS/cm	137	147	153	132	161	122	124	148	133	124	139
Sulphate	mg/L	28	31	31	28	39	23	27	30	26	24	29
Calcium (Ca)	mg/L	21.8	24.6	24.8	20.9	27.2	22.5	21.2	24.3	22.8	20.9	23.5
Iron (Fe)	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Silver (Ag)	mg/L				< 0.00001					< 0.00001		
Aluminum (Al)	mg/L				< 0.01					0.01		
Arsenic (As)	mg/L				0.0003					0.0009		
Barium (Ba)	mg/L				0.00386					0.00472		
Beryllium (Be)	mg/L				< 0.00002					< 0.00002		
Boron (B)	mg/L				0.0008					0.0009		
Bismuth (Bi)	mg/L				< 0.00001					< 0.00001		
Cadmium (Cd)	mg/L				0.000031					< 0.000003		
Cobalt (Co)	mg/L				0.001669					0.00224		
Chromium (Cr)	mg/L				< 0.0005					< 0.0005		
Copper (Cu)	mg/L				0.0069					0.0034		
Potassium (K)	mg/L				1.90					2.01		
Lithium (Li)	mg/L				0.005					0.005		
Magnesium (Mg)	mg/L				0.433					0.485		
Manganese (Mn)	mg/L				0.0649					0.103		
Molybdenum (Mo)	mg/L				0.00007					0.00006		
Nickel (Ni)	mg/L				0.0064					0.0075		
Lead (Pb)	mg/L				< 0.00002					0.00002		
Antimony (Sb)	mg/L				0.0004					< 0.0002		
Selenium (Se)	mg/L				< 0.001					< 0.001		
Tin (Sn)	mg/L				0.00012					0.00013		
Strontium (Sr)	mg/L				0.0354					0.0377		
Titanium (Ti)	mg/L				< 0.0001					< 0.0001		
Thallium (Tl)	mg/L				< 0.0002					< 0.0002		
Uranium (U)	mg/L				0.000005					0.000022		
Vanadium (V)	mg/L				< 0.00003					< 0.00003		
Tungsten (W)	mg/L				< 0.00003					< 0.00003		
Yttrium (Y)	mg/L				< 0.000001					0.000002		
Zinc (Zn)	mg/L				0.002					< 0.001		

Week#0 signifies the initial flooding of the humidity cell initiating the 20 week test period.

Humidity Cell Results from Sample MAR07-96

Analyte	Unit	Wk#108	Wk#109	Wk#110	Wk#111	Wk#112	Wk#113	Wk#114	Wk#115	Wk#116	Wk#117	Wk#118
		CA11057-OCT09	CA11166-OCT09	CA10007-NOV09	CA11043-NOV09	CA11124-NOV09	CA11145-NOV09	CA10003-DEC09	CA10028-DEC09	CA10053-DEC09	CA11201-DEC09	CA11234-DEC09
		20-Oct-09	27-Oct-09	03-Nov-09	10-Nov-09	17-Nov-09	24-Nov-09	01-Dec-09	08-Dec-09	15-Dec-09	22-Dec-09	29-Dec-09
Leachate Volume Added	mL	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Leachate Volume Recovered	mL	859	866	876	962	960	981	986	973	979	986	986
pH	-	7.02	6.73	6.72	7.21	7.31	7.38	7.50	7.45	7.44	7.26	7.57
Acidity	mg/L as CaCO3	65	67	60	19	3	< 2	< 2	< 2	< 2	< 2	< 2
Alkalinity	mg/L as CaCO3	6	4	4	12	20	20	17	21	22	17	21
Conductivity	µS/cm	141	145	140	157	144	143	113	139	120	108	117
Sulphate	mg/L	28	31	32	39	35	28	23	26	22	21	20
Calcium (Ca)	mg/L	22.8	25.0	25.5	27.3	27.1	23.7	19.7	25.5	20.9	18.9	18.1
Iron (Fe)	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Silver (Ag)	mg/L			0.00002					0.00001			
Aluminum (Al)	mg/L			< 0.01					< 0.01			
Arsenic (As)	mg/L			< 0.0002					0.0003			
Barium (Ba)	mg/L			0.00551					0.00584			
Beryllium (Be)	mg/L			0.00008					< 0.00002			
Boron (B)	mg/L			0.0004					0.0012			
Bismuth (Bi)	mg/L			< 0.00001					< 0.00001			
Cadmium (Cd)	mg/L			< 0.000003					< 0.000003			
Cobalt (Co)	mg/L			0.00494					0.00345			
Chromium (Cr)	mg/L			< 0.0005					< 0.0005			
Copper (Cu)	mg/L			0.0061					0.0094			
Potassium (K)	mg/L			1.9					1.85			
Lithium (Li)	mg/L			0.006					0.005			
Magnesium (Mg)	mg/L			0.584					0.588			
Manganese (Mn)	mg/L			0.159					0.207			
Molybdenum (Mo)	mg/L			0.00004					0.00006			
Nickel (Ni)	mg/L			0.0161					0.014			
Lead (Pb)	mg/L			< 0.00002					< 0.00002			
Antimony (Sb)	mg/L			0.0004					< 0.0002			
Selenium (Se)	mg/L			< 0.001					< 0.001			
Tin (Sn)	mg/L			0.00017					0.0002			
Strontium (Sr)	mg/L			0.0427					0.0378			
Titanium (Ti)	mg/L			< 0.0001					< 0.0001			
Thallium (Tl)	mg/L			< 0.0002					< 0.0002			
Uranium (U)	mg/L			0.000001					0.000003			
Vanadium (V)	mg/L			< 0.00003					< 0.00003			
Tungsten (W)	mg/L			0.00005					< 0.00003			
Yttrium (Y)	mg/L			0.000005					0.000003			
Zinc (Zn)	mg/L			0.002					0.001			

Week#0 signifies the initial flooding of the humidity cell initiating the 20 week test period.

Humidity Cell Results from Sample MAR07-96

Analyte	Unit	Wk#119	Wk#120	Wk#121	Wk#122	Wk#123	Wk#124	Wk#125	Wk#126	Wk#127	Wk#128	Wk#129
		CA10003-JAN010	CA10027-JAN10	CA10053-JAN10	CA10078-JAN10	CA10003-FEB10	CA10028-FEB10	CA10057-FEB10	CA10083-FEB10	CA10003-MAR10	CA10029-MAR10	CA10055-MAR10
		05-Jan-10	12-Jan-10	19-Jan-09	26-Jan-09	02-Feb-09	09-Feb-10	16-Feb-10	23-Feb-10	02-Mar-10	09-Mar-10	16-Mar-10
Leachate Volume Added	mL	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Leachate Volume Recovered	mL	984	984	957	988	965	982	985	980	983	981	984
pH	-	7.52	7.49	7.18	7.36	7.51	7.35	7.34	7.21	7.36	7.15	7.17
Acidity	mg/L as CaCO3	< 2	< 2	< 2	< 2	< 2	< 2	< 2	8	< 2	40	21
Alkalinity	mg/L as CaCO3	21	17	15	16	15	14	14	11	14	10	10
Conductivity	µS/cm	107	119	111	113	108	108	107	126	124	188	164
Sulphate	mg/L	23	22	21	20	22	20	21	18	26	36	32
Calcium (Ca)	mg/L	18	18.9	17.7	17.9	17.5	16.5	16.4	16.3	18.3	40.5	23.7
Iron (Fe)	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.01
Silver (Ag)	mg/L		0.00002					< 0.00001				
Aluminum (Al)	mg/L		< 0.01					< 0.01				
Arsenic (As)	mg/L		0.0007					< 0.0002				
Barium (Ba)	mg/L		0.0051					0.00525				
Beryllium (Be)	mg/L		< 0.00002					< 0.00002				
Boron (B)	mg/L		0.0011					0.0009				
Bismuth (Bi)	mg/L		< 0.00001					< 0.00001				
Cadmium (Cd)	mg/L		0.000046					0.000004				
Cobalt (Co)	mg/L		0.00311					0.0029				
Chromium (Cr)	mg/L		< 0.0005					< 0.0005				
Copper (Cu)	mg/L		0.0057					0.0051				
Potassium (K)	mg/L		1.64					1.38				
Lithium (Li)	mg/L		0.004					0.003				
Magnesium (Mg)	mg/L		0.498					0.554				
Manganese (Mn)	mg/L		0.142					0.143				
Molybdenum (Mo)	mg/L		0.00007					0.00008				
Nickel (Ni)	mg/L		0.011					0.0107				
Lead (Pb)	mg/L		0.00004					0.00013				
Antimony (Sb)	mg/L		< 0.0002					< 0.0002				
Selenium (Se)	mg/L		< 0.001					< 0.001				
Tin (Sn)	mg/L		0.00019					0.00026				
Strontium (Sr)	mg/L		0.0287					0.0261				
Titanium (Ti)	mg/L		0.0003					0.0001				
Thallium (Tl)	mg/L		< 0.0002					< 0.0002				
Uranium (U)	mg/L		0.000006					0.000003				
Vanadium (V)	mg/L		0.00004					< 0.00003				
Tungsten (W)	mg/L		< 0.00003					< 0.00003				
Yttrium (Y)	mg/L		0.000004					0.000006				
Zinc (Zn)	mg/L		0.003					0.002				

Week#0 signifies the initial flooding of the humidity cell initiating the 20 week test period.

Humidity Cell Results from Sample MAR07-96

Analyte	Unit	Wk#130	Wk#131	Wk#132	Wk#133	Wk#134	Wk#135	Wk#136	Wk#137	Wk#138	Wk#139
		CA10080-MAR10	CA10124-MAR10	CA10003-APR10	CA10030-APR10	CA11072-APR10	CA11096-APR10	CA10003-MAY10	CA10029-MAY10	CA10054-MAY10	CA10079-MAY10
		23-Mar-10	30-Mar-10	06-Apr-10	13-Apr-10	20-Apr-10	27-Apr-10	04-May-10	11-May-10	18-May-10	25-May-10
Leachate Volume Added	mL	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Leachate Volume Recovered	mL	973	915	974	852	856	945	886	917	829	845
pH	-	6.86	5.92	6.28	4.99	5.10	5.98	5.24	5.53	5.59	5.32
Acidity	mg/L as CaCO3	22	284	32	269	199	96	147	76	124	98
Alkalinity	mg/L as CaCO3	8	< 2	3	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Conductivity	µS/cm	141	297	187	309	291	234	246	167	212	199
Sulphate	mg/L	31	29	55	34	56	75	52	42	51	50
Calcium (Ca)	mg/L	22.4	46.8	28.2	45.5	41.1	33.2	30.5	18.5	23.2	22.6
Iron (Fe)	mg/L	0.04	0.08	0.61	0.33	0.38	0.35	0.32	0.20	0.748	0.704
Silver (Ag)	mg/L	0.00004					< 0.00001				
Aluminum (Al)	mg/L	0.02					0.28				
Arsenic (As)	mg/L	0.0005					0.0008				
Barium (Ba)	mg/L	0.00761					0.0288				
Beryllium (Be)	mg/L	< 0.00002					0.00004				
Boron (B)	mg/L	0.0008					0.0019				
Bismuth (Bi)	mg/L	0.00002					0.00002				
Cadmium (Cd)	mg/L	0.000013					0.000132				
Cobalt (Co)	mg/L	0.00632					0.217				
Chromium (Cr)	mg/L	< 0.0005					< 0.0005				
Copper (Cu)	mg/L	0.0331					0.0263				
Potassium (K)	mg/L	1.52					3.13				
Lithium (Li)	mg/L	0.005					0.014				
Magnesium (Mg)	mg/L	1.04					5.89				
Manganese (Mn)	mg/L	0.284					1.11				
Molybdenum (Mo)	mg/L	0.00003					0.00003				
Nickel (Ni)	mg/L	0.0255					0.705				
Lead (Pb)	mg/L	0.00004					0.00002				
Antimony (Sb)	mg/L	< 0.0002					0.0002				
Selenium (Se)	mg/L	0.001					0.003				
Tin (Sn)	mg/L	0.00013					0.00012				
Strontium (Sr)	mg/L	0.0385					0.0663				
Titanium (Ti)	mg/L	< 0.0001					0.0005				
Thallium (Tl)	mg/L	< 0.0002					< 0.0002				
Uranium (U)	mg/L	0.000002					< 0.000001				
Vanadium (V)	mg/L	< 0.00003					< 0.00003				
Tungsten (W)	mg/L	< 0.00003					< 0.00003				
Yttrium (Y)	mg/L	0.000006					0.000203				
Zinc (Zn)	mg/L	0.003					0.022				

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Humidity Cell Results from Sample MAR07-96

Analyte	Unit	Wk #140	Wk # 141	Wk #142	Wk #143	Wk # 144	Wk # 145	Wk #146	Wk #147	Wk #148
		CA10003-JUN10	CA10028-JUN10	CA10066-JUN10	CA10078-JUN10	CA10182-JUN10	CA10002-JUL10	CA10038-JUL10	CA10064-JUL10	CA11318-JUL10
		01-Jun-10	08-June-10	15-Jun-10	22-Jun-10	29-June-10	06-Jul-10	13-Jul-10	21-Jul-10	27-Jul-10
Leachate Volume Added	mL	1000	1000	1000	1000	1000	1000	1000	1000	1000
Leachate Volume Recovered	mL	838	840	871	912	976	954	980	987	991
pH	-	5.31	5.16	5.43	5.08	5.62	5.54	5.43	5.68	5.77
Acidity	mg/L as CaCO3	79	81	73	3	44	30	20	18	16
Alkalinity	mg/L as CaCO3	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Conductivity	µS/cm	189	167	157	168	206	221	166	149	139
Sulphate	mg/L	51	44	40	49	82	86	66	56	48
Calcium (Ca)	mg/L	20.0	18.7	15.8	17.4	23.1	25.2	15.0	14.5	14.0
Iron (Fe)	mg/L	0.63	0.659	0.499	0.546	4.77	7.68	5.31	4.33	2.90
Silver (Ag)	mg/L	0.00004					0.00022			< 0.00001
Aluminum (Al)	mg/L	0.87					0.54			0.25
Arsenic (As)	mg/L	0.0003					0.0007			< 0.0002
Barium (Ba)	mg/L	0.0230					0.0297			0.0185
Beryllium (Be)	mg/L	0.00010					0.00006			0.00004
Boron (B)	mg/L	0.0016					0.0018			0.0018
Bismuth (Bi)	mg/L	< 0.00001					0.00002			< 0.00001
Cadmium (Cd)	mg/L	0.000170					0.000172			0.000232
Cobalt (Co)	mg/L	0.233					0.170			0.0554
Chromium (Cr)	mg/L	< 0.0005					< 0.0005			< 0.0005
Copper (Cu)	mg/L	0.0434					0.0381			0.0144
Potassium (K)	mg/L	2.22					2.34			1.62
Lithium (Li)	mg/L	0.012					0.009			0.006
Magnesium (Mg)	mg/L	5.48					5.86			3.06
Manganese (Mn)	mg/L	0.678					0.786			0.465
Molybdenum (Mo)	mg/L	0.00006					0.00009			0.00002
Nickel (Ni)	mg/L	0.739					0.554			0.251
Lead (Pb)	mg/L	0.00050					0.00005			0.00007
Antimony (Sb)	mg/L	< 0.0002					< 0.0002			0.0005
Selenium (Se)	mg/L	0.002					0.003			0.002
Tin (Sn)	mg/L	0.00010					0.00006			0.00042
Strontium (Sr)	mg/L	0.0405					0.0475			0.0269
Titanium (Ti)	mg/L	< 0.0001					0.0001			0.0002
Thallium (Tl)	mg/L	< 0.0002					< 0.0002			< 0.0002
Uranium (U)	mg/L	0.000032					0.000032			0.000015
Vanadium (V)	mg/L	< 0.00003					< 0.00003			< 0.00003
Tungsten (W)	mg/L	< 0.00003					< 0.00003			< 0.00003
Yttrium (Y)	mg/L	0.000228					0.000505			0.000237
Zinc (Zn)	mg/L	0.031					0.022			0.008

Week#0 signifies the initial flooding of the humidity cell initiating the 20 week test period.

**Summary of Results from Humidity Cell and Submerged Column
Tests on Process Solids Samples**

Summary of Humidity Cell Results for Low-Sulphur Process Solids

Sample ID Week		2475-01 0	2475-01 1	2475-01 2	2475-01 3	2475-01 4	2475-01 5	2475-01 6	2475-01 7	2475-01 8	2475-01 9	2475-01 10	2475-01 11	2475-01 12	2475-01 13	2475-01 14
Analyte	Units															
Volume Water Added	L	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Volume Water Recovered	L	1.3	1	1.01	1	0.99	1	1	1	1	1	1	1.01	0.99	1	1.01
pH	---	6.84	6.65	5.73	6.38	5.84	6.08	6.34	6.43	6.93	6.76	6.95	6.82	5.74	6.6	5.78
Conductivity	mS	0.44	0.10	0.06	0.06	0.06	0.06	0.06	0.10	0.09	0.11	0.10	0.07	0.11	0.10	0.06
Acidity	mg/L as CaCO3	<2	-	2.7	2.8	3.4	3.4	2.8	3.6	3.6	2.6	3.8	2.8	2.2	2.6	8.2
Alkalinity	mg/L as CaCO3	-	32.5	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Aluminum (Al)	mg/L	0.065	0.128	0.084	0.085	0.059	0.063	0.064	0.066	0.104	0.086	0.080	0.072	0.063	0.079	0.099
Dissolved Antimony (Sb)	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Dissolved Arsenic (As)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Barium (Ba)	mg/L	0.023	<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
Dissolved Beryllium (Be)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Bismuth (Bi)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Boron (B)	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dissolved Cadmium (Cd)	mg/L	0.00011	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Dissolved Calcium (Ca)	mg/L	98.7	19.8	12.6	13.0	14.6	15.2	14.6	14.2	13.8	15.3	15.9	14.0	17.7	14.8	13.5
Dissolved Chromium (Cr)	mg/L	0.0082	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Cobalt (Co)	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Dissolved Copper (Cu)	mg/L	0.0259	0.0014	0.0012	<0.001	0.0012	<0.001	0.0012	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0017	0.0017
Dissolved Iron (Fe)	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dissolved Lead (Pb)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Magnesium (Mg)	mg/L	1.96	0.73	0.64	0.82	1.22	1.33	1.41	1.50	1.44	1.80	1.72	1.59	1.75	1.81	1.68
Dissolved Manganese (Mn)	mg/L	0.0050	<0.001	<0.001	0.0012	0.0020	0.0021	0.0024	0.0022	0.0058	0.0025	0.0027	0.0030	0.0034	0.0037	0.0028
Dissolved Molybdenum (Mo)	mg/L	0.0339	0.0137	0.0031	0.0017	0.0011	0.0011	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Nickel (Ni)	mg/L	0.0057	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Dissolved Phosphorus (P)	mg/L	0.274	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dissolved Potassium (K)	mg/L	14.8	9.1	7.3	5.8	5.1	5.5	4.8	4.5	4.3	4.4	3.4	2.9	3.4	3.2	2.8
Dissolved Selenium (Se)	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Dissolved Silicon (Si)	mg/L	1.54	2.54	2.27	1.96	1.66	1.90	1.95	2.46	2.08	1.97	2.0	1.3	1.8	1.8	1.7
Dissolved Silver (Ag)	mg/L	0.00244	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Dissolved Sodium (Na)	mg/L	18.1	5.15	2.34	1.28	0.94	0.85	0.75	0.68	0.63	0.71	1.03	0.51	0.64	0.56	0.51
Dissolved Strontium (Sr)	mg/L	0.416	0.0927	0.0613	0.0593	0.0663	0.0725	0.0676	0.0693	0.0750	0.0718	0.0672	0.0638	0.0706	0.0731	0.0646
Dissolved Sulphur (S)	mg/L	105	25.1	5.2	3.2	3.1	1.9	2.0	2.1	2.2	2.2	<5	<5	<5	<5	<5
Dissolved Thallium (Tl)	mg/L	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Dissolved Tin (Sn)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Titanium (Ti)	mg/L	0.0089	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.0023	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Dissolved Tungsten (W)	mg/L	<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
Dissolved Uranium (U)	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Dissolved Vanadium (V)	mg/L	<0.001	0.0021	0.0013	0.0011	<0.001	<0.001	0.0010	0.0010	0.0011	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Zinc (Zn)	mg/L	0.0042	<0.003	<0.003	<0.003	<0.003	<0.003	0.0031	<0.003	<0.003	0.0031	0.0032	<0.003	<0.003	0.0059	0.0057
Dissolved Zirconium (Zr)	mg/L	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Sulphate (SO4)	mg/L	315	75.3	15.6	9.6	9.3	5.7	6	6.3	6.6	6.6	<15	<15	<15	<15	<15

Summary of Humidity Cell Results for Low-Sulphur Process Solids

Sample ID		2475-01	2475-01	2475-01	2475-01	2475-01	2475-01	2475-01	2475-01	2475-01	2475-01	2475-01	2475-01	2475-01	2475-01	2475-01
Week		15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
Analyte	Units															
Volume Water Added	L	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Volume Water Recovered	L	1	1	1	1	1.01	0.99	1	1	1	1	1	1	1	1	1
pH	---	5.45	5.9	5.93	6.94	7.33	6.34	7.21	6.08	5.69	6.96	7.53	5.58	5.79	6.06	7.4
Conductivity	mS	0.14	0.10	0.09	0.12	0.12	0.09	0.09	0.01	0.09	0.07	0.07	0.07	0.11	0.13	0.07
Acidity	mg/L as CaCO3	12.2	4.2	3.2	-	-	3.0	-	7.4	10.0	-	-	7.4	6.0	7.2	2.4
Alkalinity	mg/L as CaCO3	-	-	-	43.6	50.5	-	43	-	-	38	44	-	-	-	-
Dissolved Aluminum (Al)	mg/L	0.090	0.072	0.094	0.097	0.096	0.081	0.096	0.090	0.096	0.092	0.095	0.082	0.095	0.093	0.084
Dissolved Antimony (Sb)	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Dissolved Arsenic (As)	mg/L	0.0011	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0010	<0.001	<0.001	<0.001	0.0014	<0.001	<0.001
Dissolved Barium (Ba)	mg/L	<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
Dissolved Beryllium (Be)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Bismuth (Bi)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Boron (B)	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dissolved Cadmium (Cd)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Dissolved Calcium (Ca)	mg/L	15.5	14.6	17.1	15.4	17.4	16.9	16.1	15.0	15.3	14.9	15.6	16.6	16.9	17.5	18.3
Dissolved Chromium (Cr)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Cobalt (Co)	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Dissolved Copper (Cu)	mg/L	0.0023	0.0010	0.0015	0.0010	<0.001	0.0012	<0.001	0.0013	0.0018	<0.001	0.0011	0.0018	0.0021	<0.001	<0.001
Dissolved Iron (Fe)	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dissolved Lead (Pb)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Magnesium (Mg)	mg/L	1.78	1.60	1.97	1.80	1.93	1.89	2.00	1.73	1.78	1.73	1.78	1.73	1.76	1.94	1.86
Dissolved Manganese (Mn)	mg/L	0.0044	0.0034	0.0035	0.0027	0.0031	0.0027	0.0023	0.0021	0.0021	0.0017	0.0016	0.0017	0.0017	0.0012	0.0012
Dissolved Molybdenum (Mo)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Nickel (Ni)	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Dissolved Phosphorus (P)	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dissolved Potassium (K)	mg/L	2.9	2.6	2.9	2.5	3.0	2.6	2.3	2.0	2.1	1.9	1.9	1.9	2.0	2.0	1.9
Dissolved Selenium (Se)	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Dissolved Silicon (Si)	mg/L	1.8	1.8	2.1	1.6	2.2	1.9	1.7	1.4	1.4	1.4	1.5	1.5	1.6	1.6	1.8
Dissolved Silver (Ag)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Dissolved Sodium (Na)	mg/L	0.51	<0.5	0.51	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dissolved Strontium (Sr)	mg/L	0.0779	0.0702	0.0813	0.0726	0.0769	0.0808	0.0744	0.0684	0.0695	0.0672	0.0688	0.0704	0.0714	0.0721	0.0746
Dissolved Sulphur (S)	mg/L	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Dissolved Thallium (Tl)	mg/L	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Dissolved Tin (Sn)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Titanium (Ti)	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Dissolved Tungsten (W)	mg/L	<0.001	<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
Dissolved Uranium (U)	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Dissolved Vanadium (V)	mg/L	<0.001	<0.001	<0.001	<0.001	0.0010	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Zinc (Zn)	mg/L	0.0082	<0.003	0.0044	<0.003	<0.003	<0.003	0.0030	0.0047	0.0086	0.0037	0.0032	0.0065	0.0088	0.0049	<0.003
Dissolved Zirconium (Zr)	mg/L	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Sulphate (SO4)	mg/L	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15

Summary of Humidity Cell Results for Low-Sulphur Process Solids

Sample ID Week		2475-01 30	2475-01 31	2475-01 32	2475-01 33	2475-01 34	2475-01 35	2475-01 36	2475-01 37	2475-01 38	2475-01 39	2475-01 40	2475-01 41	2475-01 42	2475-01 43	2475-01 44
Analyte	Units															
Volume Water Added	L	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Volume Water Recovered	L	1	0.9	1	1	1	1	1	1	1	1	1	1	1.01	1	0.98
pH	---	7.55	6.24	6.69	7.18	7.42	7.07	6.77	6.94	7.31	7.22	7.24	7.53	7.35	7.36	7.19
Conductivity	mS	0.04	0.15	0.05	0.07	0.10	0.09	0.00	0.06	0.06	0.08	0.08	0.06	0.09	0.10	0.10
Acidity	mg/L as CaCO3	-	2.8	3.4	2.2	<2	3.8	6.4		2.0		<2		3.1		2.3
Alkalinity	mg/L as CaCO3	44	-	-	-	-	-	-		-		-		-		-
Dissolved Aluminum (Al)	mg/L	0.080	0.096	0.094	0.097	0.129	0.105	0.104		0.119		0.092		0.085		0.0954
Dissolved Antimony (Sb)	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005		<0.005		<0.005		<0.005		<0.0001
Dissolved Arsenic (As)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001		<0.001		<0.001		<0.0001
Dissolved Barium (Ba)	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		<0.01		<0.01		<0.01		0.00446
Dissolved Beryllium (Be)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001		<0.001		<0.001		<0.0005
Dissolved Bismuth (Bi)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001		<0.001		<0.001		<0.0005
Dissolved Boron (B)	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05		<0.05		<0.05		<0.05		<0.01
Dissolved Cadmium (Cd)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	0.00016	<0.0001	<0.0001		<0.0001		<0.0001		<0.0001		<0.00001
Dissolved Calcium (Ca)	mg/L	17.2	18.3	17.7	18.6	19.7	19.1	18.4		19.9		19.9		19.9		19.2
Dissolved Chromium (Cr)	mg/L	<0.001	<0.001	<0.001	0.0012	<0.001	<0.001	<0.001		<0.001		<0.001		<0.001		0.00011
Dissolved Cobalt (Co)	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005		<0.0005		<0.0005		<0.0005		<0.0001
Dissolved Copper (Cu)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0012		<0.001		<0.001		<0.001		<0.0005
Dissolved Iron (Fe)	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05		<0.05		<0.05		<0.05		<0.03
Dissolved Lead (Pb)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001		<0.001		<0.001		<0.00005
Dissolved Magnesium (Mg)	mg/L	1.84	1.72	1.80	1.87	2.11	1.95	1.86		1.58		1.56		1.86		1.87
Dissolved Manganese (Mn)	mg/L	0.0012	0.0013	0.0014	0.0015	0.0019	0.0013	0.0015		0.0014		0.0013		0.0013		0.00166
Dissolved Molybdenum (Mo)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001		<0.001		<0.001		0.000265
Dissolved Nickel (Ni)	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002		<0.002		<0.002		<0.002		<0.0005
Dissolved Phosphorus (P)	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05		<0.05		<0.05		<0.05		<0.3
Dissolved Potassium (K)	mg/L	1.7	1.9	1.9	1.8	1.9	1.8	1.7		1.6		1.5		1.5		1.46
Dissolved Selenium (Se)	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005		<0.005		<0.005		<0.005		0.00037
Dissolved Silicon (Si)	mg/L	1.5	1.7	1.7	1.8	1.7	1.7	1.6		1.3		1.4		1.4		1.21
Dissolved Silver (Ag)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		<0.0001		<0.0001		<0.0001		<0.00001
Dissolved Sodium (Na)	mg/L	<0.5	0.60	<0.5	0.54	0.51	<0.5	0.57		<0.5		<0.5		<0.5		0.278
Dissolved Strontium (Sr)	mg/L	0.0693	0.0748	0.0755	0.0715	0.0761	0.0737	0.0678		0.0717		0.0735		0.0673		0.0692
Dissolved Sulphur (S)	mg/L	<5	<5	<5	<5	6.0	5.5	5.5		5.9		<5		6.0		5.74
Dissolved Thallium (Tl)	mg/L	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003		<0.0003		<0.0003		<0.0003		<0.0001
Dissolved Tin (Sn)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001		<0.001		<0.001		<0.0001
Dissolved Titanium (Ti)	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002		<0.002		<0.002		<0.002		<0.01
Dissolved Tungsten (W)	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		<0.01		<0.01		<0.01		-
Dissolved Uranium (U)	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005		<0.005		<0.005		<0.005		0.000128
Dissolved Vanadium (V)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001		<0.001		<0.001		<0.001
Dissolved Zinc (Zn)	mg/L	<0.003	<0.003	0.0039	<0.003	0.0066	0.0047	0.0095		<0.003		<0.003		<0.003		<0.003
Dissolved Zirconium (Zr)	mg/L	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004		<0.004		<0.004		<0.004		-
Sulphate (SO4)	mg/L	<15	<15	<15	<15	18	16.5	16.5		17.7		15		18		17.22

Summary of Humidity Cell Results for Low-Sulphur Process Solids

Sample ID Week		2475-01 45	2475-01 46	2475-02 0	2475-02 1	2475-02 2	2475-02 3	2475-02 4	2475-02 5	2475-02 6	2475-02 7	2475-02 8	2475-02 9	2475-02 10	2475-02 11	2475-02 12
Analyte	Units															
Volume Water Added	L	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1
Volume Water Recovered	L	1	1	1.77	1	1	1	1	1	0.99	1	1	1	1	1	1
pH	---	7.38	7.28	7.81	7.11	5.89	6.29	6.07	6.23	6.27	6.41	6.38	6.93	6.26	6.79	6.09
Conductivity	mS	0.06	0.07	0.10	0.16	0.04	0.05	0.04	0.04	0.05	0.08	0.08	0.08	0.09	0.05	0.08
Acidity	mg/L as CaCO3			<2	-	2.0	3.0	2.6	3.6	2.6	4.2	3.6	2.4	3.4	3.0	2.8
Alkalinity	mg/L as CaCO3			-	42.0	-	-	-	-	-	-	-	-	-	-	-
Dissolved Aluminum (Al)	mg/L			0.151	0.301	0.264	0.225	0.149	0.150	0.118	0.108	0.116	0.133	0.106	0.101	0.096
Dissolved Antimony (Sb)	mg/L			<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Dissolved Arsenic (As)	mg/L			<0.001	0.0015	0.0018	0.0012	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Barium (Ba)	mg/L			<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
Dissolved Beryllium (Be)	mg/L			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Bismuth (Bi)	mg/L			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Boron (B)	mg/L			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dissolved Cadmium (Cd)	mg/L			<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Dissolved Calcium (Ca)	mg/L			23.6	29.6	9.18	8.74	9.71	9.96	10.3	10.2	10.5	11.6	12.3	12.5	12.7
Dissolved Chromium (Cr)	mg/L			0.0041	0.0043	0.0010	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Cobalt (Co)	mg/L			<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Dissolved Copper (Cu)	mg/L			<0.001	0.0022	0.0014	<0.001	0.0012	<0.001	0.0011	0.0010	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Iron (Fe)	mg/L			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dissolved Lead (Pb)	mg/L			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Magnesium (Mg)	mg/L			<0.5	<0.5	<0.5	<0.5	<0.5	0.51	0.75	0.90	0.96	1.35	1.40	1.58	1.58
Dissolved Manganese (Mn)	mg/L			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0011	<0.001	<0.001	0.0012	<0.001
Dissolved Molybdenum (Mo)	mg/L			0.0072	0.0205	0.0038	0.0021	0.0013	0.0012	<0.001	<0.001	0.0011	<0.001	<0.001	<0.001	<0.001
Dissolved Nickel (Ni)	mg/L			<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.0026	<0.002
Dissolved Phosphorus (P)	mg/L			0.057	0.082	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dissolved Potassium (K)	mg/L			2.6	8.3	5.9	6.0	5.3	5.0	4.7	4.5	4.2	4.4	3.5	3.4	3.2
Dissolved Selenium (Se)	mg/L			<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Dissolved Silicon (Si)	mg/L			0.62	2.79	2.43	2.19	1.83	1.75	1.86	2.28	1.89	2.02	2.0	1.7	1.9
Dissolved Silver (Ag)	mg/L			<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Dissolved Sodium (Na)	mg/L			3.70	7.83	3.04	1.85	1.23	0.97	0.82	0.70	0.62	0.79	0.62	0.53	0.53
Dissolved Strontium (Sr)	mg/L			0.0962	0.136	0.0449	0.0433	0.0483	0.0504	0.0563	0.0600	0.0657	0.0657	0.0659	0.0702	0.0616
Dissolved Sulphur (S)	mg/L			23.8	49.2	7.6	3.9	2.8	1.6	1.8	1.3	1.7	1.6	<5	<5	<5
Dissolved Thallium (Tl)	mg/L			<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	0.00035	<0.0003	<0.0003	<0.0003	<0.0003
Dissolved Tin (Sn)	mg/L			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Titanium (Ti)	mg/L			<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Dissolved Tungsten (W)	mg/L			<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
Dissolved Uranium (U)	mg/L			<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Dissolved Vanadium (V)	mg/L			0.0011	0.0082	0.0065	0.0046	0.0024	0.0025	0.0021	0.0019	0.0020	0.0015	0.0013	0.0013	0.0012
Dissolved Zinc (Zn)	mg/L			<0.003	<0.003	0.0037	<0.003	<0.003	<0.003	0.0032	<0.003	<0.003	0.0038	<0.003	<0.003	<0.003
Dissolved Zirconium (Zr)	mg/L			<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Sulphate (SO4)	mg/L			71.4	147.6	22.8	11.7	8.4	4.8	5.4	3.9	5.1	4.8	<15	<15	<15

Summary of Humidity Cell Results for Low-Sulphur Process Solids

Sample ID		2475-02	2475-02	2475-02	2475-02	2475-02	2475-02	2475-02	2475-02	2475-02	2475-02	2475-02	2475-02	2475-02	2475-02	2475-02
Week		13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
Analyte	Units															
Volume Water Added	L	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Volume Water Recovered	L	1	1	0.99	1	1	1	1	1.01	1	1	0.98	0.99	1	0.99	1
pH	---	6.5	6.17	5.64	6.17	6.62	6.92	7.38	6.01	7.07	6.69	6.61	7.38	7.52	5.53	5.74
Conductivity	mS	0.10	0.05	0.12	0.10	0.08	0.08	0.12	0.08	0.07	0.06	0.07	0.06	0.06	0.06	0.11
Acidity	mg/L as CaCO3	2.8	2.2	6.8	3.0	2.6	-	-	3.0	-	5.2	5.2	-	-	7.0	7.0
Alkalinity	mg/L as CaCO3	-	-	-	-	-	38.1	40.5	-	36	-	-	36	40	-	-
Dissolved Aluminum (Al)	mg/L	0.113	0.111	0.086	0.091	0.120	0.122	0.116	0.096	0.119	0.125	0.125	0.122	0.12	0.098	0.105
Dissolved Antimony (Sb)	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Dissolved Arsenic (As)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Barium (Ba)	mg/L	<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
Dissolved Beryllium (Be)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Bismuth (Bi)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Boron (B)	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dissolved Cadmium (Cd)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Dissolved Calcium (Ca)	mg/L	11.4	11.1	11.0	11.6	13.4	12.9	12.9	12.6	12.3	12.5	12.0	12.0	13.1	14.0	14.4
Dissolved Chromium (Cr)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0013	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Cobalt (Co)	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Dissolved Copper (Cu)	mg/L	0.0014	0.0013	0.0013	0.0013	<0.001	<0.001	0.0012	0.0015	0.0013	<0.001	0.0012	<0.001	0.0016	0.0015	0.0018
Dissolved Iron (Fe)	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dissolved Lead (Pb)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Magnesium (Mg)	mg/L	1.66	1.67	1.72	1.66	2.05	1.85	1.91	1.75	1.86	1.90	1.75	1.76	1.99	1.85	1.88
Dissolved Manganese (Mn)	mg/L	0.0013	0.0011	0.0015	0.0015	0.0017	0.0016	0.0017	0.0018	0.0016	0.0022	0.0018	0.0015	0.0019	0.0019	0.0020
Dissolved Molybdenum (Mo)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Nickel (Ni)	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Dissolved Phosphorus (P)	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dissolved Potassium (K)	mg/L	3.0	2.8	2.7	2.7	2.8	2.5	2.6	2.3	2.2	2.0	1.9	1.8	1.9	1.9	1.9
Dissolved Selenium (Se)	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Dissolved Silicon (Si)	mg/L	1.8	1.8	1.8	1.9	2.3	1.8	2.3	1.8	1.7	1.5	1.5	1.4	1.6	1.7	1.7
Dissolved Silver (Ag)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Dissolved Sodium (Na)	mg/L	0.54	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dissolved Strontium (Sr)	mg/L	0.0667	0.0647	0.0703	0.0691	0.0776	0.0743	0.0727	0.0740	0.0739	0.0729	0.0694	0.0676	0.0739	0.0766	0.0784
Dissolved Sulphur (S)	mg/L	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Dissolved Thallium (Tl)	mg/L	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Dissolved Tin (Sn)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Titanium (Ti)	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Dissolved Tungsten (W)	mg/L	<0.001	<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
Dissolved Uranium (U)	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Dissolved Vanadium (V)	mg/L	0.0015	0.0014	0.0012	0.0014	0.0014	0.0013	0.0015	0.0012	0.0011	<0.001	0.0010	<0.001	0.001	<0.001	0.0010
Dissolved Zinc (Zn)	mg/L	0.0049	0.0033	0.0040	<0.003	<0.003	<0.003	0.0049	0.0062	<0.003	0.0038	0.0067	<0.003	0.0038	0.0052	0.0061
Dissolved Zirconium (Zr)	mg/L	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Sulphate (SO4)	mg/L	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15

Summary of Humidity Cell Results for Low-Sulphur Process Solids

Sample ID Week		2475-02 28	2475-02 29	2475-02 30	2475-02 31	2475-02 32	2475-02 33	2475-02 34	2475-02 35	2475-02 36	2475-02 37	2475-02 38	2475-02 39	2475-02 40	2475-02 41	2475-02 42
Analyte	Units															
Volume Water Added	L	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Volume Water Recovered	L	0.97	1	1	0.95	1	1	1	1	0.97	1	1	1	1	1	1
pH	---	6.14	7.07	7.61	6.63	6.57	7.13	7.53	7.49	7.34	6.92	7.39	7.1	7.35	7.59	7.37
Conductivity	mS	0.09	0.04	0.04	0.08	0.06	0.06	0.08	0.08	0.04	0.05	0.06	0.06	0.04	0.05	0.06
Acidity	mg/L as CaCO3	5.0	2.6	-	2.4	3.6	2.4	<2	5.8	2.4		2.4		<2		2.0
Alkalinity	mg/L as CaCO3	-		37	-	-	-	-	-	-		-		-		-
Dissolved Aluminum (Al)	mg/L	0.122	0.114	0.110	0.121	0.143	0.128	0.136	0.115	0.122		0.141		0.119		0.113
Dissolved Antimony (Sb)	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005		<0.005		<0.005		<0.005
Dissolved Arsenic (As)	mg/L	0.0011	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001		<0.001		<0.001
Dissolved Barium (Ba)	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		<0.01		<0.01		<0.01
Dissolved Beryllium (Be)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001		<0.001		<0.001
Dissolved Bismuth (Bi)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001		<0.001		<0.001
Dissolved Boron (B)	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05		<0.05		<0.05		<0.05
Dissolved Cadmium (Cd)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		<0.0001		<0.0001		<0.0001
Dissolved Calcium (Ca)	mg/L	14.1	14.9	13.8	14.4	15.1	14.7	15.1	16.7	15.4		16.7		16.9		15.6
Dissolved Chromium (Cr)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	0.0011	<0.001	<0.001	<0.001		<0.001		<0.001		<0.001
Dissolved Cobalt (Co)	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005		<0.0005		<0.0005		<0.0005
Dissolved Copper (Cu)	mg/L	0.0012	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001		<0.001		<0.001
Dissolved Iron (Fe)	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05		<0.05		<0.05		<0.05
Dissolved Lead (Pb)	mg/L	0.0012	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001		<0.001		<0.001
Dissolved Magnesium (Mg)	mg/L	1.85	1.81	1.73	1.62	1.75	1.68	1.94	1.99	1.87		1.56		1.50		1.65
Dissolved Manganese (Mn)	mg/L	0.0015	0.0016	0.0013	0.0014	0.0017	0.0016	0.0016	0.0019	0.0018		0.0017		0.0016		0.0014
Dissolved Molybdenum (Mo)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001		<0.001		<0.001
Dissolved Nickel (Ni)	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002		<0.002		<0.002		<0.002
Dissolved Phosphorus (P)	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05		<0.05		<0.05		<0.05
Dissolved Potassium (K)	mg/L	1.9	1.8	1.6	1.7	1.7	1.6	1.7	1.7	1.6		1.5		1.5		1.3
Dissolved Selenium (Se)	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005		<0.005		<0.005		<0.005
Dissolved Silicon (Si)	mg/L	1.6	1.8	1.5	1.6	1.6	1.7	1.7	1.7	1.7		1.4		1.5		1.3
Dissolved Silver (Ag)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		<0.0001		<0.0001		<0.0001
Dissolved Sodium (Na)	mg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5		<0.5		<0.5
Dissolved Strontium (Sr)	mg/L	0.0734	0.0761	0.0700	0.0744	0.0775	0.0711	0.0764	0.0809	0.0736		0.0765		0.0768		0.0660
Dissolved Sulphur (S)	mg/L	<5	<5	<5	<5	<5	<5	<5	<5	<5		<5		<5		<5
Dissolved Thallium (Tl)	mg/L	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003		<0.0003		<0.0003		<0.0003
Dissolved Tin (Sn)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001		<0.001		<0.001
Dissolved Titanium (Ti)	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002		<0.002		<0.002		<0.002
Dissolved Tungsten (W)	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		<0.01		<0.01		<0.01
Dissolved Uranium (U)	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005		<0.005		<0.005		<0.005
Dissolved Vanadium (V)	mg/L	<0.001	<0.001	<0.001	0.0011	0.0012	0.0010	0.0011	0.0010	0.0012		<0.001		<0.001		<0.001
Dissolved Zinc (Zn)	mg/L	0.0062	<0.003	<0.003	<0.003	0.0037	<0.003	<0.003	0.0056	0.0044		<0.003		<0.003		<0.003
Dissolved Zirconium (Zr)	mg/L	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004		<0.004		<0.004		<0.004
Sulphate (SO4)	mg/L	<15	<15	<15	<15	<15	<15	<15	<15	<15		<15		<15		<15

Summary of Humidity Cell Results for Low-Sulphur Process Solids

Sample ID Week		2475-02 43	2475-02 44	2475-02 45	2475-02 46	2475-03 0	2475-03 1	2475-03 2	2475-03 3	2475-03 4	2475-03 5	2475-03 6	2475-03 7	2475-03 8	2475-03 9	2475-03 10
Analyte	Units															
Volume Water Added	L	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1
Volume Water Recovered	L	1	1	1	1	1.7	1.1	0.95	1	0.94	1	0.98	1.01	0.95	1.01	1
pH	---	7.51	7.22	7.45	7.34	8.51	6.83	5.74	6.3	6.15	6.15	6.26	6.41	6.4	6.2	6.29
Conductivity	mS	0.07	0.08	0.04	0.05	0.04	0.16	0.04	0.05	0.05	0.05	0.06	0.07	0.10	0.08	0.08
Acidity	mg/L as CaCO3		<2			<2	-	2.7	3.0	3.1	3.2	3.0	3.2	4.0	2.8	3.0
Alkalinity	mg/L as CaCO3		-			-	24.3	-	-	-	-	-	-	-	-	-
Dissolved Aluminum (Al)	mg/L		0.109			0.163	0.299	0.110	0.126	0.088	0.114	0.091	0.088	0.094	0.144	0.116
Dissolved Antimony (Sb)	mg/L		<0.0001			<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Dissolved Arsenic (As)	mg/L		0.00016			<0.001	0.0018	0.0010	<0.001	<0.001	<0.001	0.0010	<0.001	<0.001	<0.001	<0.001
Dissolved Barium (Ba)	mg/L		0.00341			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Dissolved Beryllium (Be)	mg/L		<0.0005			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Bismuth (Bi)	mg/L		<0.0005			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Boron (B)	mg/L		<0.01			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dissolved Cadmium (Cd)	mg/L		<0.00001			<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Dissolved Calcium (Ca)	mg/L		15.8			12.8	21.8	10.2	9.64	11.9	10.7	13.3	11.6	13.1	12.1	12.4
Dissolved Chromium (Cr)	mg/L		0.00012			0.0125	0.0310	0.0022	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Cobalt (Co)	mg/L		<0.0001			<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Dissolved Copper (Cu)	mg/L		<0.0005			0.0026	0.0044	0.0018	<0.001	<0.001	<0.001	0.0018	0.0010	<0.001	<0.001	<0.001
Dissolved Iron (Fe)	mg/L		<0.03			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dissolved Lead (Pb)	mg/L		<0.00005			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Magnesium (Mg)	mg/L		1.70			<0.5	<0.5	0.97	0.77	1.24	1.00	1.70	1.53	1.76	1.82	1.62
Dissolved Manganese (Mn)	mg/L		0.00134			<0.001	<0.001	<0.001	<0.001	0.0011	0.0010	0.0019	0.0018	0.0022	0.0016	0.0020
Dissolved Molybdenum (Mo)	mg/L		0.000227			0.0045	0.0213	0.0038	0.0017	0.0011	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Nickel (Ni)	mg/L		<0.0005			<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Dissolved Phosphorus (P)	mg/L		<0.3			0.056	0.121	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dissolved Potassium (K)	mg/L		1.32			1.4	7.6	6.7	6.8	5.8	5.0	5.2	4.7	4.6	4.1	3.3
Dissolved Selenium (Se)	mg/L		0.00032			<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Dissolved Silicon (Si)	mg/L		1.16			0.69	3.62	2.47	2.67	2.14	1.95	2.18	2.86	2.27	2.18	2.1
Dissolved Silver (Ag)	mg/L		<0.00001			<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Dissolved Sodium (Na)	mg/L		0.204			2.75	9.49	3.99	2.09	1.19	0.84	0.86	0.71	0.60	0.63	0.53
Dissolved Strontium (Sr)	mg/L		0.0668			0.0478	0.0956	0.0581	0.0492	0.0633	0.0553	0.0722	0.0676	0.0829	0.0673	0.0636
Dissolved Sulphur (S)	mg/L		3.80			9.1	25.3	3.6	1.9	1.9	<1	1.1	<1	<1	1.1	<5
Dissolved Thallium (Tl)	mg/L		<0.0001			<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Dissolved Tin (Sn)	mg/L		<0.0001			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Titanium (Ti)	mg/L		<0.01			<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Dissolved Tungsten (W)	mg/L		-			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Dissolved Uranium (U)	mg/L		0.000084			<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Dissolved Vanadium (V)	mg/L		<0.001			0.0016	0.0152	0.0029	0.0036	0.0018	0.0023	0.0017	0.0019	0.0019	0.0018	0.0015
Dissolved Zinc (Zn)	mg/L		<0.003			<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.0047	<0.003	<0.003	<0.003	<0.003
Dissolved Zirconium (Zr)	mg/L		-			<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Sulphate (SO4)	mg/L		11.4			27.3	75.9	10.8	5.7	5.7	<3	3.3	<3	<3	3.3	<15

Summary of Humidity Cell Results for Low-Sulphur Process Solids

Sample ID		2475-03	2475-03	2475-03	2475-03	2475-03	2475-03	2475-03	2475-03	2475-03	2475-03	2475-03	2475-03	2475-03	2475-03	2475-03
Week		11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Analyte	Units															
Volume Water Added	L	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Volume Water Recovered	L	1	1	1	1	1	1.01	0.99	1	0.99	1.05	1	1	0.99	1	1.05
pH	---	6.75	6.11	6.7	6.28	5.88	6.49	6.65	7.2	7.44	6.39	7.18	6.71	5.56	6.76	7.45
Conductivity	mS	0.05	0.09	0.12	0.06	0.13	0.09	0.10	0.09	0.13	0.07	0.07	0.05	0.08	0.06	0.05
Acidity	mg/L as CaCO3	2.6	2.6	2.0	2.2	6.2	2.4	3.2	-	-	4.8	-	4.4	10.4	-	-
Alkalinity	mg/L as CaCO3	-	-	-	-	-	-	-	46.6	49.2	-	44	-	-	37	39
Dissolved Aluminum (Al)	mg/L	0.097	0.087	0.098	0.096	0.080	0.087	0.116	0.107	0.088	0.110	0.106	0.106	0.116	0.107	0.108
Dissolved Antimony (Sb)	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Dissolved Arsenic (As)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0011	<0.001	<0.001
Dissolved Barium (Ba)	mg/L	<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
Dissolved Beryllium (Be)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Bismuth (Bi)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Boron (B)	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dissolved Cadmium (Cd)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Dissolved Calcium (Ca)	mg/L	12.3	14.1	12.5	13.8	13.1	12.7	15.4	14.3	15.5	13.5	14.3	13.5	12.9	13.3	12.7
Dissolved Chromium (Cr)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0010	0.0010	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Cobalt (Co)	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Dissolved Copper (Cu)	mg/L	<0.001	<0.001	0.0017	0.0019	0.0012	0.0010	0.0013	<0.001	0.0012	0.0014	<0.001	<0.001	0.0022	<0.001	0.0013
Dissolved Iron (Fe)	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dissolved Lead (Pb)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Magnesium (Mg)	mg/L	1.65	1.68	1.78	1.96	1.89	1.74	2.20	1.90	1.97	1.68	1.89	1.76	1.61	1.68	1.51
Dissolved Manganese (Mn)	mg/L	0.0023	0.0023	0.0028	0.0025	0.0024	0.0022	0.0025	0.0022	0.0024	0.0031	0.0019	0.0019	0.0021	0.0019	0.0016
Dissolved Molybdenum (Mo)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Nickel (Ni)	mg/L	0.0024	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Dissolved Phosphorus (P)	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dissolved Potassium (K)	mg/L	3.4	3.5	3.1	3.2	2.8	2.5	3.0	2.7	2.8	2.4	2.3	2.0	2.0	2.0	1.9
Dissolved Selenium (Se)	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Dissolved Silicon (Si)	mg/L	2.0	2.3	1.9	2.2	2.0	2.0	2.5	2.0	2.6	2.0	1.8	1.5	1.6	1.6	1.7
Dissolved Silver (Ag)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Dissolved Sodium (Na)	mg/L	0.52	<0.5	0.50	0.52	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dissolved Strontium (Sr)	mg/L	0.0678	0.0659	0.0739	0.0774	0.0781	0.0744	0.0865	0.0798	0.0828	0.0735	0.0813	0.0727	0.0690	0.0695	0.0649
Dissolved Sulphur (S)	mg/L	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Dissolved Thallium (Tl)	mg/L	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Dissolved Tin (Sn)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Titanium (Ti)	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Dissolved Tungsten (W)	mg/L	<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
Dissolved Uranium (U)	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Dissolved Vanadium (V)	mg/L	0.0015	0.0013	0.0015	0.0013	0.0012	0.0013	0.0014	0.0013	0.0015	0.0013	<0.001	<0.001	<0.001	<0.001	0.0011
Dissolved Zinc (Zn)	mg/L	<0.003	<0.003	0.0044	0.0059	0.0033	<0.003	<0.003	<0.003	<0.003	0.0047	<0.003	<0.003	0.0078	0.0034	0.0032
Dissolved Zirconium (Zr)	mg/L	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Sulphate (SO4)	mg/L	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15

Summary of Humidity Cell Results for Low-Sulphur Process Solids

Sample ID Week		2475-03 26	2475-03 27	2475-03 28	2475-03 29	2475-03 30	2475-03 31	2475-03 32	2475-03 33	2475-03 34	2475-03 35	2475-03 36	2475-03 37	2475-03 38	2475-03 39	2475-03 40
Analyte	Units															
Volume Water Added	L	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Volume Water Recovered	L	1	1	1	0.95	1	1	1	0.95	1.05	0.95	1	0.95	1	1	1
pH	---	5.48	5.5	6.07	7.08	7.07	6.72	6.41	7.35	7.5	7.26	7.13	6.94	7.35	7.37	7.25
Conductivity	mS	0.08	0.09	0.10	0.05	0.05	0.12	0.05	0.05	0.07	0.07	0.06	0.05	0.07	0.05	0.06
Acidity	mg/L as CaCO3	8.4	13.2	4.8	2.2	-	2.4	3.4	2.4	<2	5.0	3.0		<2		<2
Alkalinity	mg/L as CaCO3	-	-	-	-	40	-	-	-	-	-	-		-		-
Dissolved Aluminum (Al)	mg/L	0.095	0.123	0.138	0.115	0.115	0.138	0.126	0.126	0.140	0.115	0.126		0.140		0.110
Dissolved Antimony (Sb)	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005		<0.005		<0.005
Dissolved Arsenic (As)	mg/L	0.0011	0.0021	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001		<0.001
Dissolved Barium (Ba)	mg/L	<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
Dissolved Beryllium (Be)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001		<0.001
Dissolved Bismuth (Bi)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001		<0.001
Dissolved Boron (B)	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05		<0.05		<0.05
Dissolved Cadmium (Cd)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		<0.0001		<0.0001
Dissolved Calcium (Ca)	mg/L	14.7	13.5	13.0	14.6	12.7	12.8	13.8	15.4	14.4	16.4	15.4		16.4		16.0
Dissolved Chromium (Cr)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0012	<0.001	<0.001	<0.001		<0.001		<0.001
Dissolved Cobalt (Co)	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005		<0.0005		<0.0005
Dissolved Copper (Cu)	mg/L	0.0018	0.0033	<0.001	<0.001	<0.001	<0.001	0.0013	<0.001	<0.001	<0.001	<0.001		<0.001		<0.001
Dissolved Iron (Fe)	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05		<0.05		<0.05
Dissolved Lead (Pb)	mg/L	<0.001	0.0011	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001		<0.001
Dissolved Magnesium (Mg)	mg/L	1.64	1.45	1.37	1.49	1.32	1.20	1.52	1.62	1.58	1.72	1.64		1.38		1.26
Dissolved Manganese (Mn)	mg/L	0.0022	0.0021	0.0015	0.0019	0.0016	0.0016	0.0021	0.0022	0.0018	0.0022	0.0021		0.0022		0.0015
Dissolved Molybdenum (Mo)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001		<0.001
Dissolved Nickel (Ni)	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002		<0.002		<0.002
Dissolved Phosphorus (P)	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05		<0.05		<0.05
Dissolved Potassium (K)	mg/L	2.0	1.9	1.8	1.8	1.6	1.6	1.8	1.8	1.7	1.7	1.7		1.6		1.5
Dissolved Selenium (Se)	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005		<0.005		<0.005
Dissolved Silicon (Si)	mg/L	1.8	1.7	1.6	1.8	1.5	1.6	1.8	2.0	1.8	1.8	1.8		1.5		1.5
Dissolved Silver (Ag)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		<0.0001		<0.0001
Dissolved Sodium (Na)	mg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5		<0.5
Dissolved Strontium (Sr)	mg/L	0.0742	0.0654	0.0617	0.0681	0.0598	0.0599	0.0673	0.0706	0.0661	0.0738	0.0644		0.0687		0.0678
Dissolved Sulphur (S)	mg/L	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5		<5		<5
Dissolved Thallium (Tl)	mg/L	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003		<0.0003		<0.0003
Dissolved Tin (Sn)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001		<0.001
Dissolved Titanium (Ti)	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002		<0.002		<0.002
Dissolved Tungsten (W)	mg/L	<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
Dissolved Uranium (U)	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005		<0.005		<0.005
Dissolved Vanadium (V)	mg/L	0.0010	0.0012	0.0011	<0.001	<0.001	0.0013	0.0013	0.0012	0.0012	0.0010	0.0013		<0.001		0.0011
Dissolved Zinc (Zn)	mg/L	0.0076	0.0129	0.0053	<0.003	<0.003	<0.003	0.0051	<0.003	<0.003	0.0053	0.0138		<0.003		<0.003
Dissolved Zirconium (Zr)	mg/L	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004		<0.004		<0.004
Sulphate (SO4)	mg/L	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15		<15		<15

Summary of Humidity Cell Results for Low-Sulphur Process Solids

Sample ID Week		2475-03 41	2475-03 42	2475-03 43	2475-03 44	2475-03 45	2475-03 46	2475-04 0	2475-04 1	2475-04 2	2475-04 3	2475-04 4	2475-04 5	2475-04 6	2475-04 7	2475-04 8
Analyte	Units															
Volume Water Added	L	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1
Volume Water Recovered	L	1	1.05	0.99	1	0.95	0.96	1.74	1	1.01	1	1.01	1	1.01	1	1
pH	---	7.53	7.35	7.54	7.27	7.61	7.36	8.61	6.77	5.93	6.61	5.72	6.26	5.9	6.3	6.58
Conductivity	mS	0.06	0.06	0.06	0.07	0.06	0.06	0.03	0.10	0.06	0.06	0.04	0.03	0.04	0.06	0.07
Acidity	mg/L as CaCO3		<2		2.0			<2	-	<2	2.6	4.4	2.8	5.0	3.6	3.6
Alkalinity	mg/L as CaCO3		-		-			-	18.7	-	-	-	-	-	-	-
Dissolved Aluminum (Al)	mg/L		0.105		0.108			0.140	0.075	0.048	0.058	0.033	0.042	0.044	0.041	0.049
Dissolved Antimony (Sb)	mg/L		<0.005		<0.0001			<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Dissolved Arsenic (As)	mg/L		<0.001		0.00013			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Barium (Ba)	mg/L		<0.01		0.00360			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Dissolved Beryllium (Be)	mg/L		<0.001		<0.0005			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Bismuth (Bi)	mg/L		<0.001		<0.0005			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Boron (B)	mg/L		<0.05		<0.01			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dissolved Cadmium (Cd)	mg/L		<0.0001		<0.00001			<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Dissolved Calcium (Ca)	mg/L		14.8		17.7			7.85	20.7	13.7	12.1	7.92	8.21	7.63	7.49	7.30
Dissolved Chromium (Cr)	mg/L		<0.001		0.00010			0.0019	0.0018	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Cobalt (Co)	mg/L		<0.0005		<0.0001			<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Dissolved Copper (Cu)	mg/L		<0.001		<0.0005			<0.001	0.0014	<0.001	<0.001	0.0011	0.0010	0.0017	0.0010	<0.001
Dissolved Iron (Fe)	mg/L		<0.05		<0.03			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dissolved Lead (Pb)	mg/L		<0.001		<0.00005			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Magnesium (Mg)	mg/L		1.40		1.75			<0.5	0.76	0.77	0.74	0.56	0.56	0.59	0.67	0.60
Dissolved Manganese (Mn)	mg/L		0.0012		0.00131			<0.001	<0.001	0.0010	0.0012	0.0011	0.0011	0.0025	0.0015	0.0016
Dissolved Molybdenum (Mo)	mg/L		<0.001		0.000270			0.0014	0.0117	0.0064	0.0055	0.0020	0.0021	0.0015	0.0014	0.0010
Dissolved Nickel (Ni)	mg/L		<0.002		<0.0005			<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Dissolved Phosphorus (P)	mg/L		<0.05		<0.3			<0.05	0.056	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dissolved Potassium (K)	mg/L		1.3		1.44			1.3	4.7	4.0	4.0	2.2	2.6	2.4	2.6	2.4
Dissolved Selenium (Se)	mg/L		<0.005		0.00023			<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Dissolved Silicon (Si)	mg/L		1.3		1.26			0.39	0.71	0.58	0.67	0.43	0.51	0.57	0.79	0.64
Dissolved Silver (Ag)	mg/L		<0.0001		<0.00001			<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Dissolved Sodium (Na)	mg/L		<0.5		0.204			1.24	4.88	3.26	2.73	1.29	1.25	1.11	1.10	0.79
Dissolved Strontium (Sr)	mg/L		0.0596		0.0689			0.0294	0.0922	0.0623	0.0512	0.0285	0.0320	0.0307	0.0329	0.0336
Dissolved Sulphur (S)	mg/L		<5		2.31			4.2	27.0	13.1	9.6	3.9	2.2	1.8	1.4	1.2
Dissolved Thallium (Tl)	mg/L		<0.0003		<0.0001			<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Dissolved Tin (Sn)	mg/L		<0.001		<0.0001			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Titanium (Ti)	mg/L		<0.002		<0.01			<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Dissolved Tungsten (W)	mg/L		<0.01		-			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Dissolved Uranium (U)	mg/L		<0.005		0.000115			<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Dissolved Vanadium (V)	mg/L		<0.001		<0.001			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Zinc (Zn)	mg/L		<0.003		<0.003			<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.0660	<0.003	<0.003
Dissolved Zirconium (Zr)	mg/L		<0.004		-			<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Sulphate (SO4)	mg/L		<15		6.93			12.6	81	39.3	28.8	11.7	6.6	5.4	4.2	3.6

Summary of Humidity Cell Results for Low-Sulphur Process Solids

Sample ID		2475-04	2475-04	2475-04	2475-04	2475-04	2475-04	2475-04	2475-04	2475-04	2475-04	2475-04	2475-04	2475-04	2475-04	2475-04
Week		9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Analyte	Units															
Volume Water Added	L	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Volume Water Recovered	L	0.99	1	1	1	1	0.98	1	0.99	1	1	0.99	1.01	1	0.99	1
pH	---	6.38	6.52	6.87	5.46	6.3	6.1	5.75	6.31	6.28	7.57	7.84	5.69	7.25	6.47	6.42
Conductivity	mS	0.10	0.07	0.02	0.07	0.07	0.03	0.06	0.06	0.05	0.03	0.05	0.08	0.04	0.03	0.06
Acidity	mg/L as CaCO3	3.4	2.4	3.0	2.8	2.6	3.2	4.6	3.0	2.2	-	2.6	<2	-	5.2	8.4
Alkalinity	mg/L as CaCO3	-	-	-	-	-	-	-	-	-	22.1	-	-	21	-	-
Dissolved Aluminum (Al)	mg/L	0.080	0.054	0.040	1.31	0.042	0.037	0.036	0.034	0.044	0.041	0.045	0.040	0.036	0.038	0.043
Dissolved Antimony (Sb)	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Dissolved Arsenic (As)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Barium (Ba)	mg/L	<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
Dissolved Beryllium (Be)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Bismuth (Bi)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Boron (B)	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dissolved Cadmium (Cd)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Dissolved Calcium (Ca)	mg/L	14.2	7.77	6.64	10.2	7.86	7.08	6.35	6.34	7.71	7.31	7.71	7.81	6.97	6.96	7.95
Dissolved Chromium (Cr)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Cobalt (Co)	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Dissolved Copper (Cu)	mg/L	<0.001	<0.001	<0.001	0.0052	0.0018	0.0015	0.0011	0.0012	0.0011	<0.001	0.0012	0.0013	0.0013	0.0012	0.0018
Dissolved Iron (Fe)	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dissolved Lead (Pb)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Magnesium (Mg)	mg/L	2.15	0.63	0.52	0.88	0.74	0.75	0.68	0.59	0.80	0.73	0.87	0.85	0.92	0.83	1.01
Dissolved Manganese (Mn)	mg/L	0.0015	0.0019	0.0026	0.0038	0.0044	0.0024	0.0022	0.0020	0.0022	0.0020	0.0031	0.0021	0.0027	0.0024	0.0032
Dissolved Molybdenum (Mo)	mg/L	0.0018	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Nickel (Ni)	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Dissolved Phosphorus (P)	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dissolved Potassium (K)	mg/L	7.7	1.9	1.5	2.8	1.9	1.8	1.5	1.4	1.7	1.5	1.8	1.6	1.5	1.4	1.7
Dissolved Selenium (Se)	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Dissolved Silicon (Si)	mg/L	2.43	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Dissolved Silver (Ag)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Dissolved Sodium (Na)	mg/L	2.35	0.56	<0.5	2.04	0.56	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dissolved Strontium (Sr)	mg/L	0.0765	0.0312	0.0257	0.0309	0.0344	0.0312	0.0290	0.0276	0.0327	0.0311	0.0331	0.0334	0.0299	0.0306	0.0358
Dissolved Sulphur (S)	mg/L	2.3	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Dissolved Thallium (Tl)	mg/L	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Dissolved Tin (Sn)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Titanium (Ti)	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Dissolved Tungsten (W)	mg/L	<0.001	<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
Dissolved Uranium (U)	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Dissolved Vanadium (V)	mg/L	0.0011	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Zinc (Zn)	mg/L	<0.003	<0.003	<0.003	0.0206	0.0048	0.0047	<0.003	<0.003	<0.003	<0.003	0.0035	0.0038	0.0037	0.0046	0.0061
Dissolved Zirconium (Zr)	mg/L	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Sulphate (SO4)	mg/L	6.9	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15

Summary of Humidity Cell Results for Low-Sulphur Process Solids

Sample ID		2475-04	2475-04	2475-04	2475-04	2475-04	2475-04	2475-04	2475-04	2475-04	2475-04	2475-04	2475-04	2475-04	2475-04	2475-04
Week		24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
Analyte	Units															
Volume Water Added	L	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Volume Water Recovered	L	1	1.05	0.98	1	1	1	1	1	1	1	1	1	1	1	1
pH	---	7.53	7.55	6.62	5.18	6.3	6.88	7.68	6.67	6.41	6.98	7.51	7.38	7.09	6.82	7.49
Conductivity	mS	0.02	0.06	0.05	0.12	0.07	0.03	0.03	0.08	0.05	0.06	0.06	0.05	0.01	0.05	0.06
Acidity	mg/L as CaCO3	-	-	3.8	9.0	6.4	3.0	-	4.4	3.0	2.2	2.0	6.0	4.8	<2	
Alkalinity	mg/L as CaCO3	21	45	-	-	-	-	36	-	-	-	-	-	-	-	-
Dissolved Aluminum (Al)	mg/L	0.037	0.071	0.071	0.113	0.136	0.113	0.113	0.114	0.153	0.127	0.128	0.123	0.136		0.135
Dissolved Antimony (Sb)	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005		<0.005
Dissolved Arsenic (As)	mg/L	<0.001	<0.001	<0.001	0.0012	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001
Dissolved Barium (Ba)	mg/L	<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
Dissolved Beryllium (Be)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001
Dissolved Bismuth (Bi)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001
Dissolved Boron (B)	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05		<0.05
Dissolved Cadmium (Cd)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		<0.0001
Dissolved Calcium (Ca)	mg/L	6.75	12.8	12.5	11.5	11.6	12.5	11.6	12.3	13.0	12.8	12.7	13.8	13.2		14.8
Dissolved Chromium (Cr)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0011	<0.001	<0.001	<0.001		<0.001
Dissolved Cobalt (Co)	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005		<0.0005
Dissolved Copper (Cu)	mg/L	<0.001	0.0012	0.0013	0.0020	<0.001	<0.001	<0.001	0.0012	0.0015	<0.001	<0.001	<0.001	<0.001		<0.001
Dissolved Iron (Fe)	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.053	<0.05	<0.05	<0.05	<0.05		<0.05
Dissolved Lead (Pb)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001
Dissolved Magnesium (Mg)	mg/L	0.83	2.15	1.62	1.36	1.36	1.37	1.25	1.19	1.38	1.26	1.58	1.43	1.37		1.12
Dissolved Manganese (Mn)	mg/L	0.0032	0.0016	0.0018	0.0018	0.0012	0.0012	<0.001	0.0010	0.0025	0.0013	0.0025	0.0013	0.0012		0

Summary of Humidity Cell Results for Low-Sulphur Process Solids

Sample ID Week		2475-04 39	2475-04 40	2475-04 41	2475-04 42	2475-04 43	2475-04 44	2475-04 45	2475-04 46
Analyte	Units								
Volume Water Added	L	1	1	1	1	1	1	1	1
Volume Water Recovered	L	1	1	1	1.05	1.02	0.99	1	0.99
pH	---	7.26	7.21	7.45	7.48	7.48	7.33	7.54	7.26
Conductivity	mS	0.04	0.06	0.05	0.06	0.06	0.06	0.05	0.04
Acidity	mg/L as CaCO3		2.0		2.1		2.2		
Alkalinity	mg/L as CaCO3		-		-		-		
Dissolved Aluminum (Al)	mg/L		0.113		0.103		0.100		
Dissolved Antimony (Sb)	mg/L		<0.005		<0.005		<0.0001		
Dissolved Arsenic (As)	mg/L		<0.001		<0.001		0.00013		
Dissolved Barium (Ba)	mg/L		<0.01		<0.01		0.00252		
Dissolved Beryllium (Be)	mg/L		<0.001		<0.001		<0.0005		
Dissolved Bismuth (Bi)	mg/L		<0.001		<0.001		<0.0005		
Dissolved Boron (B)	mg/L		<0.05		<0.05		<0.01		
Dissolved Cadmium (Cd)	mg/L		<0.0001		<0.0001		<0.00001		
Dissolved Calcium (Ca)	mg/L		14.1		13.6		15.9		
Dissolved Chromium (Cr)	mg/L		<0.001		<0.001		0.00013		
Dissolved Cobalt (Co)	mg/L		<0.0005		<0.0005		<0.0001		
Dissolved Copper (Cu)	mg/L		<0.001		<0.001		0.00071		
Dissolved Iron (Fe)	mg/L		<0.05		<0.05		<0.03		
Dissolved Lead (Pb)	mg/L		<0.001		<0.001		<0.00005		
Dissolved Magnesium (Mg)	mg/L		1.06		1.32		1.50		
Dissolved Manganese (Mn)	mg/L		0.0011		0.0014		0.00146		
Dissolved Molybdenum (Mo)	mg/L		<0.001		<0.001		0.000208		
Dissolved Nickel (Ni)	mg/L		<0.002		<0.002		<0.0005		
Dissolved Phosphorus (P)	mg/L		<0.05		<0.05		<0.3		
Dissolved Potassium (K)	mg/L		1.8		1.7		1.76		
Dissolved Selenium (Se)	mg/L		<0.005		<0.005		0.00023		
Dissolved Silicon (Si)	mg/L		1.4		1.2		1.04		
Dissolved Silver (Ag)	mg/L		<0.0001		<0.0001		<0.00001		
Dissolved Sodium (Na)	mg/L		<0.5		<0.5		0.212		
Dissolved Strontium (Sr)	mg/L		0.0596		0.0564		0.0612		
Dissolved Sulphur (S)	mg/L		<5		<5		2.09		
Dissolved Thallium (Tl)	mg/L		<0.0003		<0.0003		<0.0001		
Dissolved Tin (Sn)	mg/L		<0.001		<0.001		<0.0001		
Dissolved Titanium (Ti)	mg/L		<0.002		<0.002		<0.01		
Dissolved Tungsten (W)	mg/L		<0.01		<0.01		-		
Dissolved Uranium (U)	mg/L		<0.005		<0.005		0.000097		
Dissolved Vanadium (V)	mg/L		0.0010		<0.001		<0.001		
Dissolved Zinc (Zn)	mg/L		<0.003		<0.003		<0.003		
Dissolved Zirconium (Zr)	mg/L		<0.004		<0.004		-		
Sulphate (SO4)	mg/L		<15		<15		6.27		

Summary of Column Results for Submerged Bulk Process Solids

Sample ID		Column A (Top)	Column A (Middle)	Column A (Bottom)	Column A	Column A	Column A	Column A	Column A	Column A	Column A	Column A	Column A	Column A	Column A	Column A	Column A
Week		0	0	0	0	1	2	3	4	5	6	7	8	9	10	11	12
Analyte	Units																
pH	---	4.46	5.81	6.08	4.31	6.4	6.3	6.31	6.08	5.99	6.95	6.59	6.84	5.97	6.39	6.98	6.93
Specific Conductance	mS	0.33	0.32	0.27	0	0.03	0.06	0.09	0.12	0.11	0.1	0.1	0.1	0.07	0.12	0.07	0.12
Acidity	mg/L as CaCO3	-	-	-	4.0	2.8	2.6	2.6	3.4	8.0	-	2.8	2.6	6.8	4.2	2.8	-
Alkalinity	mg/L as CaCO3	-	-	-	-	-	-	-	-	-	44.6	-	-	-	-	-	44
Dissolved Aluminum (Al)	mg/L	0.992	0.505	0.308	0.021	0.063	0.053	0.046	0.049	0.041	0.042	0.036	0.035	0.034	0.033	0.028	0.020
Dissolved Antimony (Sb)	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Dissolved Arsenic (As)	mg/L	0.0044	0.0024	0.0022	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0010	<0.001	<0.001	<0.001
Dissolved Barium (Ba)	mg/L	0.012	0.014	0.012	<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
Dissolved Beryllium (Be)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Bismuth (Bi)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Boron (B)	mg/L	0.120	0.097	0.102	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dissolved Cadmium (Cd)	mg/L	0.00058	0.00084	0.00068	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Dissolved Calcium (Ca)	mg/L	6.09	6.34	7.86	1.44	4.16	7.46	9.12	11.8	11.7	14.4	13.7	13.7	14.7	16.2	16.3	15.0
Dissolved Chromium (Cr)	mg/L	0.0016	<0.001	0.0011	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Cobalt (Co)	mg/L	0.00052	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Dissolved Copper (Cu)	mg/L	0.0017	0.0014	0.0012	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Iron (Fe)	mg/L	0.322	0.109	0.082	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dissolved Lead (Pb)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Magnesium (Mg)	mg/L	<0.5	<0.5	0.76	<0.5	<0.5	<0.5	<0.5	0.68	0.83	0.92	0.98	1.06	1.26	1.32	1.31	1.24
Dissolved Manganese (Mn)	mg/L	0.0052	0.0028	0.0026	0.0042	0.0055	0.0074	0.0094	0.0123	0.0116	0.0136	0.0141	0.0144	0.0168	0.0162	0.0200	0.0178
Dissolved Molybdenum (Mo)	mg/L	0.172	0.159	0.138	0.0036	0.0060	0.0090	0.0100	0.0125	0.0131	0.0150	0.0170	0.0170	0.0175	0.0190	0.0183	0.0168
Dissolved Nickel (Ni)	mg/L	0.0065	0.0023	0.0021	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Dissolved Phosphorus (P)	mg/L	4.01	4.88	4.39	0.160	0.081	0.109	0.105	0.138	0.138	0.134	0.130	0.120	0.152	0.146	0.138	0.107
Dissolved Potassium (K)	mg/L	17.8	17.8	19.2	1.1	2.7	3.7	4.0	5.2	5.1	6.0	5.9	6.0	6.0	6.3	6.1	5.7
Dissolved Selenium (Se)	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Dissolved Silicon (Si)	mg/L	2.6	2.1	2.1	<1	<1	<1	<1	<1	<1	<1	1.2	1.1	1.3	1.2	1.3	<1
Dissolved Silver (Ag)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Dissolved Sodium (Na)	mg/L	71.8	67.9	68.9	2.03	4.72	6.19	6.21	8.11	10.3	9.14	9.09	9.90	11.3	11.7	10.6	9.96
Dissolved Strontium (Sr)	mg/L	0.0674	0.0737	0.0863	0.0084	0.0226	0.0406	0.0482	0.0622	0.0647	0.0758	0.0750	0.0795	0.0800	0.0833	0.0892	0.0794
Dissolved Sulphur (S)	mg/L	15.4	18.5	19.0	<5	<5	<5	<5	<5	<5	<5	6.2	<5	6.0	6.3	5.9	<5
Dissolved Thallium (Tl)	mg/L	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Dissolved Tin (Sn)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Titanium (Ti)	mg/L	0.0051	0.0031	0.0026	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Dissolved Tungsten (W)	mg/L	<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
Dissolved Uranium (U)	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Dissolved Vanadium (V)	mg/L	0.0022	0.0013	0.0012	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Zinc (Zn)	mg/L	0.0443	0.0309	0.0377	0.0058	<0.003	<0.003	0.0036	0.0087	0.0065	<0.003	0.0042	0.0034	0.0078	<0.003	<0.003	<0.003
Dissolved Zirconium (Zr)	mg/L	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Sulphate (SO4)	mg/L	46.2	55.5	57	<15	<15	<15	<15	<15	<15	<15	18.6	<15	18	18.9	17.7	<15

*Samples from week 24 experienced sample matrix effects, which required dilution of sample, and consequently increased the detection limits by 10x

Summary of Column Results for Submerged Bulk Process Solids

Sample ID		Column A	Column A	Column A	Column A	Column A	Column A	Column A	Column A	Column A	Column A	Column A	Column A	Column A (Top)	Column A (Middle)	Column A (Bottom)	Column B (Top)
Week		13	14	15	16	17	18	19	20	21	22	23	24*	24*	24*	24*	0
Analyte	Units																
pH	---	7.05	6.45	7.16	6.79	7.26	7.3	7.23	7.18	7.1	7.2	7.31	7.32	8.91	9.1	8.99	5.47
Specific Conductance	mS	0.13	0.15	0.1	0.16	0.16	0.13	0.13	0.11	0.11	0.14	0.12	0.12	0.18	0.3	0.33	0.62
Acidity	mg/L as CaCO3	-	5.6	-	2.2	-	-	<2	2.6	<2	4.0	5.8	<2	-	-	-	-
Alkalinity	mg/L as CaCO3	49	-	48	-	50	45	-	-	-	-	-	-	-	-	-	-
Dissolved Aluminum (Al)	mg/L	0.022	0.029	0.027	0.024	0.018	0.028	0.028	0.028	0.032	0.028	0.028	<0.1	0.49	2.10	1.43	0.047
Dissolved Antimony (Sb)	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.05	<0.05	<0.05	<0.05	<0.005
Dissolved Arsenic (As)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.01	<0.01	<0.01	0.0030
Dissolved Barium (Ba)	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.1	<0.1	<0.1	<0.1	0.026
Dissolved Beryllium (Be)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.01	<0.01	<0.01	<0.001
Dissolved Bismuth (Bi)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.01	<0.01	<0.01	<0.001
Dissolved Boron (B)	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.5	0.79	1.38	1.56	0.100
Dissolved Cadmium (Cd)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.00019	<0.0001	<0.0001	<0.001	<0.001	<0.001	<0.001	0.00025
Dissolved Calcium (Ca)	mg/L	16	17.0	16.6	18.0	17.2	17.6	17.4	17.8	17.4	17.2	18.1	18.2	<5	<5	<5	34.3
Dissolved Chromium (Cr)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0022	<0.001	<0.001	<0.001	<0.01	<0.01	<0.01	<0.01	<0.001
Dissolved Cobalt (Co)	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.005	<0.005	<0.005	<0.005	<0.0005
Dissolved Copper (Cu)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.01	<0.01	<0.01	0.0019
Dissolved Iron (Fe)	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.5	<0.5	<0.5	<0.5	<0.05
Dissolved Lead (Pb)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.01	<0.01	<0.01	<0.001
Dissolved Magnesium (Mg)	mg/L	1.3	1.48	1.45	1.57	1.45	1.47	1.66	1.60	1.76	1.62	1.80	<5	<5	<5	<5	5.89
Dissolved Manganese (Mn)	mg/L	0.0171	0.0162	0.0121	0.0092	0.0041	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.01	<0.01	<0.01	0.0207
Dissolved Molybdenum (Mo)	mg/L	0.0193	0.0191	0.0193	0.0209	0.0186	0.0201	0.0203	0.0210	0.0202	0.0204	0.0178	0.020	0.084	0.191	0.225	0.0684
Dissolved Nickel (Ni)	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.02	<0.02	<0.02	<0.02	0.0059
Dissolved Phosphorus (P)	mg/L	0.112	0.117	0.112	0.132	0.092	0.109	0.112	0.105	0.112	0.115	0.109	<0.5	0.91	3.80	5.44	3.64
Dissolved Potassium (K)	mg/L	5.9	6.2	5.9	6.2	5.6	6.1	6.0	5.8	5.8	5.8	6.0	<10	13	15	17	30
Dissolved Selenium (Se)	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.05	<0.05	<0.05	<0.05	<0.005
Dissolved Silicon (Si)	mg/L	1.2	1.3	1.3	1.4	1.1	1.4	1.4	1.7	1.4	1.5	1.7	<10	<10	<10	<10	1.8
Dissolved Silver (Ag)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.0001
Dissolved Sodium (Na)	mg/L	9.88	10.5	10.8	10.7	9.67	9.73	10.9	10.3	10.9	10.3	10.8	10.4	42.0	66.3	71.6	94.0
Dissolved Strontium (Sr)	mg/L	0.0858	0.0882	0.0855	0.0916	0.0914	0.0935	0.0953	0.0906	0.0909	0.0927	0.0873	0.099	0.030	0.040	0.039	0.412
Dissolved Sulphur (S)	mg/L	6.4	6.6	6.4	8.3	6.1	7.5	8.2	7.7	8.6	8.2	8.5	<50	<50	<50	<50	67.7
Dissolved Thallium (Tl)	mg/L	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.003	<0.003	<0.003	<0.003	<0.0003
Dissolved Tin (Sn)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.01	<0.01	<0.01	<0.001
Dissolved Titanium (Ti)	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.02	<0.02	<0.02	<0.02	0.0040
Dissolved Tungsten (W)	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.1	<0.1	<0.1	<0.1	<0.01
Dissolved Uranium (U)	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.05	<0.05	<0.05	<0.05	<0.005
Dissolved Vanadium (V)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.01	<0.01	<0.01	<0.001
Dissolved Zinc (Zn)	mg/L	<0.003	0.0046	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.0038	0.0056	<0.03	<0.03	0.074	0.120	0.0341
Dissolved Zirconium (Zr)	mg/L	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.04	<0.04	<0.04	<0.04	<0.004
Sulphate (SO4)	mg/L	19.2	19.8	19.2	24.9	18.3	22.5	24.6	23.1	25.8	24.6	25.5	<150	<150	<150	<150	203.1

*Samples from week 24 experienced sample matrix effects, which required dilution of sample, and consequently increased the detection limits by 10x

Summary of Column Results for Submerged Bulk Process Solids

Sample ID		Column B (Middle)	Column B (Bottom)	Column B	Column B	Column B	Column B	Column B	Column B	Column B	Column B	Column B	Column B	Column B	Column B	Column B	Column B
Week		0	0	0	1	2	3	4	5	6	7	8	9	10	11	12	13
Analyte	Units																
pH	---	5.79	5.83	5.3	6.43	6.53	6.37	6.3	6.54	7.24	6.87	7.15	6.12	6.68	6.95	7.2	6.99
Specific Conductance	mS	0.45	0.5	0.02	0.05	0.09	0.13	0.15	0.15	0.15	0.14	0.15	0.11	0.18	0.08	0.09	0.16
Acidity	mg/L as CaCO3	-	-	3.4	2.8	2.6	2.6	2.8	4.2	-	<2	<2	6.8	3.6	2.4	-	-
Alkalinity	mg/L as CaCO3	-	-	-	-	-	-	-	-	53.7	-	-	-	-	-	49	47
Dissolved Aluminum (Al)	mg/L	0.076	0.058	0.015	0.031	0.040	0.041	0.043	0.037	0.035	0.029	0.031	0.030	0.031	0.026	0.020	0.022
Dissolved Antimony (Sb)	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Dissolved Arsenic (As)	mg/L	0.0032	0.0019	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Barium (Ba)	mg/L	0.017	0.014	<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
Dissolved Beryllium (Be)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Bismuth (Bi)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Boron (B)	mg/L	0.110	0.102	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dissolved Cadmium (Cd)	mg/L	0.00021	0.00018	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Dissolved Calcium (Ca)	mg/L	24.2	26.0	2.94	5.24	11.2	13.1	16.8	17.7	20.1	19.4	19.0	19.9	22.2	22.6	20.3	22.2
Dissolved Chromium (Cr)	mg/L	0.0010	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Cobalt (Co)	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Dissolved Copper (Cu)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Iron (Fe)	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dissolved Lead (Pb)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Magnesium (Mg)	mg/L	3.67	3.86	<0.5	<0.5	0.87	0.97	1.38	1.74	1.69	1.74	1.97	2.09	2.32	2.09	2.01	2.11
Dissolved Manganese (Mn)	mg/L	0.0104	0.0086	0.0099	0.0077	0.0120	0.0154	0.0226	0.0233	0.0256	0.0262	0.0248	0.0300	0.0315	0.0369	0.0326	0.0359
Dissolved Molybdenum (Mo)	mg/L	0.0682	0.0752	0.0026	0.0039	0.0086	0.0091	0.0112	0.0120	0.0126	0.0140	0.0136	0.0139	0.0154	0.0149	0.0133	0.0158
Dissolved Nickel (Ni)	mg/L	0.0058	0.0046	0.0021	0.0020	<0.002	0.0025	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Dissolved Phosphorus (P)	mg/L	3.81	3.77	0.119	0.109	0.226	0.220	0.281	0.290	0.280	0.270	0.271	0.318	0.326	0.320	0.241	0.278
Dissolved Potassium (K)	mg/L	31	32.8	1.9	3.0	6.0	6.2	7.7	8.1	8.8	8.6	8.4	8.4	8.7	8.8	7.9	8.2
Dissolved Selenium (Se)	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Dissolved Silicon (Si)	mg/L	1.9	2.1	<1	<1	<1	1.0	1.2	1.2	1.1	1.4	1.4	1.5	1.6	1.6	1.1	1.6
Dissolved Silver (Ag)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Dissolved Sodium (Na)	mg/L	98.9	88.6	4.12	5.63	10.1	9.01	11.6	13.8	12.5	12.8	14.1	14.3	15.3	13.8	12.6	12.9
Dissolved Strontium (Sr)	mg/L	0.283	0.330	0.0203	0.0373	0.0716	0.0814	0.104	0.111	0.118	0.120	0.118	0.125	0.132	0.139	0.125	0.133
Dissolved Sulphur (S)	mg/L	56.8	53.5	<5	<5	9.0	8.4	9.9	11.8	11.4	11.8	10.8	13.1	14.8	14.5	11.8	14.9
Dissolved Thallium (Tl)	mg/L	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Dissolved Tin (Sn)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Titanium (Ti)	mg/L	0.0037	0.0028	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Dissolved Tungsten (W)	mg/L	<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
Dissolved Uranium (U)	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Dissolved Vanadium (V)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Zinc (Zn)	mg/L	0.0193	0.0155	<0.003	<0.003	<0.003	0.0031	0.0082	0.0051	0.0034	<0.003	<0.003	0.0043	<0.003	<0.003	<0.003	<0.003
Dissolved Zirconium (Zr)	mg/L	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Sulphate (SO4)	mg/L	170.4	160.5	<15	<15	27	25.2	29.7	35.4	34.2	35.4	32.4	39.3	44.4	43.5	35.4	44.7

*Samples from week 24 experienced sample matrix effects, which required dilution of sample, and consequently increased the detection limits by 10x

Summary of Column Results for Submerged Bulk Process Solids

Sample ID		Column B	Column B	Column B	Column B	Column B	Column B	Column B	Column B	Column B	Column B	Column B	Column B (Top)	Column B (Middle)	Column B (Bottom)
Week		14	15	16	17	18	19	20	21	22	23	24*	24*	24*	24*
Analyte	Units														
pH	---	6.43	7.56	6.9	7.36	7.46	6.85	7.04	7.38	7.45	7.2	7.34	8.38	8.68	8.78
Specific Conductance	mS	0.2	0.11	0.18	0.23	0.18	0.13	0.16	0.19	0.13	0.1	0.14	0.34	0.43	0.45
Acidity	mg/L as CaCO3	5.6	-	2.6	-	-	3.2	2.6	2.0	4.4	7.0	<2	-	-	-
Alkalinity	mg/L as CaCO3	-	51	-	52	49	-	-	-	-	-	-	-	-	-
Dissolved Aluminum (Al)	mg/L	0.027	0.027	0.024	0.020	0.027	0.033	0.031	0.032	0.030	0.028	<0.1	<0.1	<0.1	<0.1
Dissolved Antimony (Sb)	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.05	<0.05	<0.05	<0.05
Dissolved Arsenic (As)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.01	<0.01	<0.01
Dissolved Barium (Ba)	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.1	<0.1	<0.1	<0.1
Dissolved Beryllium (Be)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.01	<0.01	<0.01
Dissolved Bismuth (Bi)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.01	<0.01	<0.01
Dissolved Boron (B)	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.059	0.053	0.059	<0.5	0.88	1.58	1.69
Dissolved Cadmium (Cd)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.00014	<0.0001	<0.0001	<0.0001	<0.0001	<0.001	<0.001	<0.001	<0.001
Dissolved Calcium (Ca)	mg/L	23.1	23.0	24.0	23.1	23.5	24.1	22.9	23.6	23.7	23.6	23.1	10.5	6.1	5.6
Dissolved Chromium (Cr)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0023	<0.001	<0.001	<0.001	<0.01	<0.01	<0.01	<0.01
Dissolved Cobalt (Co)	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.005	<0.005	<0.005	<0.005
Dissolved Copper (Cu)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	0.0010	<0.001	<0.001	0.0012	<0.001	<0.01	<0.01	<0.01	<0.01
Dissolved Iron (Fe)	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.5	<0.5	<0.5	<0.5
Dissolved Lead (Pb)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.01	<0.01	<0.01
Dissolved Magnesium (Mg)	mg/L	2.25	2.31	2.35	2.15	2.18	2.48	2.36	2.57	2.43	2.42	<5	<5	<5	<5
Dissolved Manganese (Mn)	mg/L	0.0372	0.0338	0.0373	0.0334	0.0346	0.0365	0.0338	0.0298	0.0290	0.0260	0.023	<0.01	<0.01	<0.01
Dissolved Molybdenum (Mo)	mg/L	0.0153	0.0156	0.0170	0.0146	0.0164	0.0174	0.0172	0.0171	0.0180	0.0156	0.018	0.082	0.157	0.189
Dissolved Nickel (Ni)	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.02	<0.02	<0.02	<0.02
Dissolved Phosphorus (P)	mg/L	0.275	0.260	0.290	0.230	0.265	0.281	0.252	0.267	0.277	0.267	0.58	2.22	5.02	6.15
Dissolved Potassium (K)	mg/L	8.6	8.2	8.4	7.8	8.2	8.5	7.9	8.1	8.2	8.1	<10	23	27	28
Dissolved Selenium (Se)	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.05	<0.05	<0.05	<0.05
Dissolved Silicon (Si)	mg/L	1.6	1.6	1.8	1.4	1.7	1.8	2.0	1.8	1.9	2.0	<10	<10	<10	<10
Dissolved Silver (Ag)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.001	<0.001	<0.001	<0.001
Dissolved Sodium (Na)	mg/L	13.3	13.5	13.4	12.2	12.1	13.7	12.7	13.7	13.4	13.0	12.7	57.8	86.0	97.4
Dissolved Strontium (Sr)	mg/L	0.141	0.134	0.139	0.141	0.138	0.146	0.132	0.135	0.141	0.133	0.144	0.155	0.091	0.083
Dissolved Sulphur (S)	mg/L	14.6	14.3	17.3	12.9	14.9	15.0	14.4	16.4	16.9	15.1	<50	<50	<50	<50
Dissolved Thallium (Tl)	mg/L	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.003	<0.003	<0.003	<0.003
Dissolved Tin (Sn)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.01	<0.01	<0.01
Dissolved Titanium (Ti)	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.02	<0.02	<0.02	<0.02
Dissolved Tungsten (W)	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.1	<0.1	<0.1	<0.1
Dissolved Uranium (U)	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.05	<0.05	<0.05	<0.05
Dissolved Vanadium (V)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.01	<0.01	<0.01
Dissolved Zinc (Zn)	mg/L	0.0049	<0.003	0.0034	<0.003	<0.003	0.0034	<0.003	<0.003	0.0043	0.0096	0.050	0.030	0.068	0.093
Dissolved Zirconium (Zr)	mg/L	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.04	<0.04	<0.04	<0.04
Sulphate (SO4)	mg/L	43.8	42.9	51.9	38.7	44.7	45	43.2	49.2	50.7	45.3	<150	<150	<150	<150

*Samples from week 24 experienced sample matrix effects, which required dilution of sample, and consequently increased the detection limits by 10x

Summary of Column Results for Submerged High-Sulphur Process Solids

Sample ID		Column 1	Column 1	Column 1	Column 1	Column 1	Column 1	Column 2	Column 2	Column 2	Column 2	Column 2	Column 2
Week		0*	1	2	3	4	5	0	1	2	3	4	5
Analyte	Units												
pH	---	6.91	7.48	7.74	7.73	7.71	7.66	7.08	7.53	7.71	7.65	7.56	7.63
Conductivity	mS	0.2	0.81	1.04	1.25	1.16	1.16	0.22	0.78	0.98	1.11	1.11	1.1
Dissolved Aluminum (Al)	mg/L	0.054	0.026	0.019	0.024	0.022	0.024	0.061	0.022	0.019	0.022	0.02	0.026
Dissolved Antimony (Sb)	mg/L	<0.005	<0.0005	<0.0005	0.0007	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0006	<0.0005	<0.0005
Dissolved Arsenic (As)	mg/L	<0.01	0.001	0.002	0.002	0.002	0.001	<0.001	0.002	0.002	0.001	<0.001	0.004
Dissolved Barium (Ba)	mg/L	<0.05	0.025	0.03	0.039	0.033	0.035	<0.005	0.024	0.029	0.034	0.032	0.031
Dissolved Beryllium (Be)	mg/L	<0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Dissolved Bismuth (Bi)	mg/L	<0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Boron (B)	mg/L	0.011	0.047	0.051	0.065	0.056	0.067	0.01	0.044	0.049	0.062	0.052	0.061
Dissolved Cadmium (Cd)	mg/L	<0.001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Dissolved Calcium (Ca)	mg/L	30	130	160	200	180	190	31	120	150	180	170	170
Dissolved Chromium (Cr)	mg/L	<0.05	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Dissolved Cobalt (Co)	mg/L	<0.005	0.0007	0.0014	0.0018	0.0019	0.0019	<0.0005	0.0007	0.0012	0.0017	0.0	0.0019
Dissolved Copper (Cu)	mg/L	<0.01	0.012	0.008	0.011	0.012	0.014	0.002	0.012	0.009	0.009	0.011	0.013
Dissolved Iron (Fe)	mg/L	<1.0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dissolved Lead (Pb)	mg/L	<0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Dissolved Lithium (Li)	mg/L	<0.05	0.013	0.013	0.013	0.012	0.015	<0.005	0.012	0.013	0.012	0.012	0.014
Dissolved Magnesium (Mg)	mg/L	6.9	36	51	67	62	69	7	34	47	58	58	63
Dissolved Manganese (Mn)	mg/L	0.021	0.18	0.22	0.27	0.24	0.25	0.022	0.17	0.2	0.25	0.24	0.23
Dissolved Molybdenum (Mo)	mg/L	<0.01	0.013	0.019	0.026	0.027	0.032	0.002	0.013	0.018	0.023	0.025	0.029
Dissolved Nickel (Ni)	mg/L	<0.01	0.011	0.016	0.022	0.02	0.022	<0.001	0.01	0.015	0.019	0.02	0.022
Dissolved Phosphorus (P)	mg/L	<1.0	2.4	3.2	4.5	3.6	4.1	0.67	2.3	2.9	3.8	3.4	3.6
Dissolved Potassium (K)	mg/L	3.8	15	17	21	19	20	4	14	16	19	18	18
Dissolved Selenium (Se)	mg/L	<0.02	<0.002	0.003	0.004	0.003	0.004	<0.002	<0.002	0.002	0.003	0.003	0.003
Dissolved Silicon (Si)	mg/L	1.1	5.1	6.2	7.1	6.8	6.6	1.2	4.8	5.9	6.8	6.5	6.3
Dissolved Silver (Ag)	mg/L	<0.001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Dissolved Sodium (Na)	mg/L	8.1	34	45	58	53	58	8.5	32	42	51	50	53
Dissolved Strontium (Sr)	mg/L	0.15	0.7	0.89	1.1	1	1.1	0.15	0.65	0.81	0.98	0.98	1
Dissolved Sulphur (S)	mg/L	32.8	155	193	245	231	261	32.6	149	180	213	224	230
Dissolved Tellurium (Te)	mg/L	<0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Thallium (Tl)	mg/L	<0.0005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Dissolved Thorium (Th)	mg/L	<0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Tin (Sn)	mg/L	<0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Titanium (Ti)	mg/L	<0.05	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Dissolved Tungsten (W)	mg/L	<0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Uranium (U)	mg/L	<0.001	0.0006	0.0015	0.002	0.0019	0.0021	<0.0001	0.0006	0.0012	0.0015	0.0018	0.0018
Dissolved Vanadium (V)	mg/L	<0.01	0.001	0.002	<0.001	<0.001	<0.001	<0.001	0.001	0.002	<0.001	<0.001	<0.001
Dissolved Zinc (Zn)	mg/L	<0.05	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Dissolved Zirconium (Zr)	mg/L	<0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Sulphate (SO4)	mg/L	98.4	465	579	735	693	783	97.8	447	540	639	672	690

*Column 1 - Week 0 had sample matrix effects, which required dilution and increased detection limits by 10x

APPENDIX 4

Golder Associates 2008.

**Geochemical Characterization Program for Feasability Study
Marathon PGM-Cu Project, Marathon, Ontario**

REPORT ON

**GEOCHEMICAL CHARACTERIZATION PROGRAM
FOR FEASIBILITY STUDY
MARATHON PGM-Cu PROJECT
MARATHON, ONTARIO**

Submitted to:

Micon International Ltd.
Suite 900, 300 Bay Street,
Toronto, Ontario
M5H 2Y2

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EXECUTIVE SUMMARY

A geochemical characterization program was undertaken for the Marathon PGM-Cu Definitive Feasibility Study. The project is located 300 km east of Thunder Bay on the north-eastern shore of Lake Superior, near the town of Marathon, Ontario, Canada. Geochemical investigations were completed to assess the acid generation and metal leaching characteristics of material that is anticipated to be representative of waste rock and tailings associated with the Marathon PGM-Cu ore body. Based on available drill core logs and cross-sections, six (6) general lithologies were identified as follows:

Major Rock Types:

- 1) Eastern Gabbro
- 2) Two Duck Lake Gabbro

Minor Rock Types:

- 3) Volcanic
- 4) Heterolithic Breccia
- 5) Syenite
- 6) Serpentine

Background information, including data from previous site investigations, was provided and used to select representative samples of rock. In total, one hundred and fourteen (114) waste rock samples were selected for geochemical analysis. In addition, a single rougher-cleaner combined tailings sample, plus eleven (11) samples of tailings from locked cycle and variability floatation testing were submitted for geochemical analysis. Nine (9) waste rock samples and one (1) average ore grade combined tailings sample were selected for kinetic testing and mineralogical analysis. The results of the static testing, kinetic testing and mineralogical analysis are presented herein.

Waste Rock

Overall, the results of the screening level assessment are in general agreement with past geochemical work. Based on our current understanding of the site geology and deposit, the key results and conclusions related to the geochemical and mineralogical characteristics of the waste rock are as follows:

- Mineralogical analysis of the rock samples indicates that the principal mineralogical assemblage consists of plagioclase, and to a lesser extent diopside, quartz and amphibole. Sulphide minerals predominately consist of pyrrhotite, chalcopyrite and pyrite, and carbonate minerals (i.e., calcite and dolomite) were detected in trace amounts.
- Acid-base accounting (ABA) results show that the majority of the rock samples collected are not expected to be acid generating. However, based on the overall quantities of sulphide minerals observed, it is possible that acid generating conditions could develop in the overall pile, if sufficient NP is not provided by the non-carbonate minerals and the

oxidation processes are not mitigated. Based on samples with a sulphide content greater than 0.3 wt% as S, the Volcanic rock type has the greatest percentage of samples that are expected to be acid generating (~40%), followed by Heterolithic Breccia (~33%), Eastern Gabbro (~7%) and Two Duck Lake Gabbro (~6%). Although the acid generation potential of most of the waste rock samples is low, approximately 7% of the samples are considered to be acid generating.

- Net acid generation (NAG) testing results are in general agreement with the ABA results and indicate that the majority of samples are non-acid generating. In addition, the NAG results indicate that some rock with sulphide contents greater than 0.3 wt% as S may be non-acid generating due to the abundance of neutralizing minerals. However, the NAG samples with sulphide contents greater than 0.5 wt% as S have the capacity to generate moderate to highly acidic conditions.
- Short-term leach testing suggests that several metals require further evaluation with respect to implications to the overall site water quality, including Al, Ag, B, Co, Cr, Cu, Fe, Pb, V and Zn,.
- In addition to the short-term leach testing, analysis of the NAG supernatant suggests that several metals require further evaluation with respect to implications to the overall site water quality, including Al, Cd, Co, Cr, Cu, Ni, Zn, and to a lesser extent B, Fe, Pb and Tl.
- Concentrations in the kinetic test leachate for the waste rock samples showed that Al, As, Cu, and to a lesser extent Cd and U, occurred at concentrations greater than PWQOs during the 56 week test period.

Tailings

Based on the analysis of the preliminary tailings samples, the key conclusions related to the geochemical characteristics of the tailings are as follows:

- Acid-base accounting (ABA) and net acid generation (NAG) testing suggest that majority of the tailings samples are not expected to be acid generating. However, the NAG test results indicate that tailings with a sulphide content as low as 0.2 wt% as S has the capacity to generate acidic conditions, if the sulphide minerals are rapidly oxidized.
- Short-term leach testing suggests that several metals require further evaluation with respect to implications to the overall site water quality, including Al, Ag, B, Co, Cr, Cu, Fe, Pb, V and Zn,.
- In addition to the short-term leach testing, analysis of the NAG supernatant suggests that several metals require further evaluation with respect to implications to the overall site water quality, including Al, Cd, Co, Cr, Cu, Ni, Zn, and to a lesser extent B, Fe, Pb and Tl.
- Concentrations in the kinetic test leachate for the single combined tailings sample (average ore grade) showed that Al, Cu and Mo occurred at concentrations greater than PWQOs at some point during the 36 week test period.
- Water quality analysis of the tailings decant indicates that some metals (i.e., Al, Fe, Mo and Zn) could be present at concentrations above PWQOs in the process water.

Water Quality Modeling

Direct runoff from the tailings is expected to be near neutral, whereas the runoff from the waste rock may reflect small zones where acidic conditions occur. When effluent/runoff water quality estimates from tailings and waste rock are fully mixed, water quality model calculations indicate that the pH is expected to be near-neutral and concentrations of some metals are expected to be low (i.e., below PWQO). However, concentrations of cadmium, cobalt, copper, iron, nickel and zinc are expected to be elevated in the mixed tailings and waste rock effluent. It is important to note that load contributions from the tailings assume that the sulphide content of the tailings will be 0.1 wt% as S. In addition, loading sources, such as runoff from the open pit, runoff from the plant site and tailings process water, were not included in the water quality modeling, but will influence the overall site water quality.

Although the majority of waste rock samples do not have acid generating properties, a portion of the waste rock could be potentially acid generating and metal leaching. Depending on the site water balance, flow logic and baseline water quality, and thus the overall site water quality, waters coming into contact with waste rock drainage or tailings effluent may require treatment or settling to reduce the total metal concentrations.

Recommendations

Based on the above results and conclusions, the following recommendations are provided:

- Preparation of a general mitigation plan considering options is recommended. For example, segregation of acid generating materials (high sulphide wastes) into a chemically stable environment (i.e., under non-acid generating tailings or underwater) may be an option that is considered.
- Confirmation and segregation, based on operational monitoring, is recommended for low sulphide material that may be considered for use in construction on-site.
- Results of the short-term, NAG, longer term repetitive leach testing (kinetic testing) and the preliminary water quality estimates should be used in conjunction with the mine plan and other baseline data (e.g., water balance and water quality) to develop estimates of overall site water quality and to develop a site water management plan.
- It is recommended that an evaluation of containment, treatment and discharge options be conducted as well as an evaluation of potential downstream impacts from the release of any water coming in contact with discharge from waste rock pile(s) and tailings management area(s).

Sulphide contents greater 0.1–0.2 wt% as S in tailings may result in the production of acidic and metal-rich waters. Thus, it is recommended that the sulphide removal processes be sufficient to maintain sulphide contents at and less than 0.1 wt% as S. If sulphide removal processes cannot maintain sulphide contents less than 0.1 wt% as S, mitigation strategies should be evaluated to reduce sulphide oxidation rates (i.e., sub-aqueous deposition, low sulphide cover over tailings or staged deposition with progressive rehabilitation).

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1.0 INTRODUCTION

Golder Associates Ltd. (Golder) has been retained by Micon International Ltd. (Micon) to participate in select engineering and environmental services as part of the Definitive Feasibility Study for the Marathon PGM-Cu Project. Micon has been retained by Marathon PGM Corporation (Marathon PGM) to complete the feasibility study, including the incorporation of work being conducted by Golder. Part of Golder's involvement includes a geochemical investigation to evaluate the acid generating and metal leaching characteristics of the waste rock and tailings that are to be deposited on-site, and to conduct preliminary water quality estimates of a mixed waste rock and tailings effluent. This report provides background and results of the initial geochemical test work and preliminary water quality estimates.

1.1 Study Objectives

The primary objective of the geochemical characterization program is to provide sufficient data for the evaluation of the chemical stability of the various materials expected to be produced during mining and mineral processing. The evaluation allows for comparisons to be made with existing environmental conditions.

Other specific objectives of a baseline geochemistry program include:

- Development of a defensible geochemical database that is sufficient for mine planning and decision making purposes;
- Development of estimates of the potential for acid rock drainage (ARD) and metal leaching (ML) for use in site water quality assessments; and
- Development of appropriate data to support decisions related to environmental management strategies, material handling strategies or mitigation measures, as required.

The study objectives were addressed by collecting and analyzing the geochemical properties of samples that are representative of waste rock and tailings. This report presents the results available at that time of reporting for the geochemical characterization program for the Marathon PGM-Cu Project.

2.0 BACKGROUND

In mining operations, the natural weathering of soils and rock is typically accelerated as these materials are disturbed and exposed to the atmosphere. Enhanced weathering of soils and rock may result in acid generation and/or accelerated leaching of metals that can potentially impact water resources (i.e., groundwater, surface water). It is, therefore, necessary to evaluate the effect that the disturbed materials will have on water quality and to assess the resulting implications with respect to mine design and the environment. If environmental issues related to mine waste geochemistry are identified, mitigation measures or changes in the project can often be developed or implemented to prevent, reduce or eliminate the impact.

2.1 Geochemistry of Mine Wastes

The environmental impacts that are of most concern are those commonly associated with the presence of reactive sulphide minerals. If sulphide minerals are exposed to the atmosphere, the sulphide minerals can potentially react with oxygen and water to mobilize and release acid, sulphate, iron and other metals. The generation of acidic and metal-rich waters as a result of coming into contact with sulphide oxidation products is commonly referred to as acid rock drainage (ARD).

The acidity produced through oxidation reactions may be attenuated by minerals that contain neutralizing capacity. Carbonate minerals are particularly important neutralizing minerals, since carbonate minerals are generally the most effective in counteracting acidic conditions. Other minerals (e.g., aluminosilicates or silicates) may also contribute to the overall neutralization potential, but the dissolution of aluminosilicate and silicate minerals is kinetically limited. Thus, silicate minerals are only significant neutralizing minerals under low pH conditions (<4.5) or where water-rock interaction times are very long (Blowes et al., 2004). If the amount of neutralizing minerals is insufficient, significant quantities of acidity may be released from the mine wastes.

In addition to acid generation properties, the leaching of metals is also an important aspect to investigate as part of a geochemical baseline study. Metal leaching can be enhanced by the generation of acidic conditions, but can also occur in the absence of reactive sulphides and under non-acidic conditions through the dissolution of soluble mineral phases. Thus, if metals are soluble under near-neutral pH conditions, even mine wastes with an abundance of neutralization potential can affect the overall site water quality.

2.2 Project Overview

The Marathon PGM-Cu Project is located 300 km east of Thunder Bay on the north-eastern shore of Lake Superior near the town of Marathon (Figure 1, Index Map). The site is located in a temperate climate that is typical of northern areas of the Canadian Shield. The winters have an

average temperature of approximately -15°C , and the summers have temperatures averaging approximately 15°C . The annual average precipitation is approximately 800 mm and the monthly average precipitation ranges from approximately 37 mm to 102 mm. The property is located in a boreal ecosystem that is characterized by a mixed forest of coniferous and hardwood trees. The terrain has moderate to steep relief, which is typical of the rugged peninsula of Lake Superior's northern shore.

In the 1920's, exploration activities in the area were initiated in search for copper and nickel resources. In the 1940's, exploration activities discovered the presence of titaniferous magnetite with associated disseminated deposits of chalcopyrite. The deposit was later found to contain economical quantities of copper, gold and platinum group metals (PGM; platinum and palladium).

As a result of the discovery of the PGM-Cu deposit, the site has undergone several stages of investigations. To better understand the site and the characteristics of the ore, numerous studies have been conducted, including geophysical surveys, prospecting, trenching, drilling programs, geological studies, resource estimates and economical analyses. Since the 1940's, several companies have continued work at the site as follows:

- 1960's – Anaconda Canada Exploration Ltd.
- 1980's – Fleck Resources Ltd.
- 2000-2001 – Geomaque Exploration Ltd. (Geomaque; now Defiance Mining Corporation).

2.2.1 Ore Extraction and Processing

Since Marathon PGM purchased the property in 2004, investigations of the site have continued as part of economic and feasibility studies. A Preliminary Economic Assessment (PEA) was completed in February 2007, and subsequently updated in April 2007, by P & E Mining Consultants (P & E, 2007). Since then, the mineral resource estimates have been updated (P & E, 2008).

The method of ore extraction will be by open pit mining, which is expected to produce 79 million tonnes (Mt) of mineable resource. The updated PEA also indicated that the average grade is expected to be 0.27% Cu, 0.08 g/t Au, 0.23 g/t Pt and 0.76 g/t Pd. The average stripping ratio (i.e., ratio of waste rock to ore) is expected to be 3.66. Thus, it is expected that more than 287 million tonnes (Mt) of waste rock will be extracted over the life-of-mine. It is anticipated that the waste rock will be stored subaerially in a waste rock management facility that will be located to the west of the open pit.

As currently understood, the ore beneficiation process will consist of typical a crushing, grinding and flotation circuit that will produce a combined concentrate from hi-grade and bulk streams. As a result, rougher and cleaner tailings will be produced and combined before deposition into the tailings management area that is located on-site.

2.3 Regional Geology

The Marathon PGM-Cu project is located within and near the eastern border of a geologic region that is referred to as the Coldwell Complex (Figure 2). The Coldwell Complex is characterized by alkalic, plutonic rocks that were emplaced into an assemblage of Archean metavolcanic and gneissic rocks approximately 1.1 billion years ago during the Proterozoic Era. Six major rock types that are grouped into three intrusive centers make-up the Coldwell Complex (P & E, 2007):

- 1) Western syenite, syenodiorite, ferroaugite-amphibole syenite which are bordered to the east and northeast by a layered gabbroic unit referred to as Eastern Gabbro.
- 2) Massive alkalic gabbro and layered nepheline syenite intrusives.
- 3) Barkevikite syenite, quartz syenite and granite.

The volcanics that underlie the eastern edge of the Coldwell Complex consist of mafic to felsic rocks, such as tuffs and rhyolite breccia.

2.4 Property Geology

The Marathon PGM-Cu property is underlain by a variety gabbroic rocks that consist mostly of layered olivine-rich gabbro (Figure 2). The major gabbroic unit is referred to as Eastern Gabbro of the Coldwell Complex. Along the eastern edge of the Eastern Gabbro, an intrusive rock unit is present that consists of coarse-grained to pegmatitic gabbro-diorite. This intrusive coarse-grained gabbro is referred to as Two Duck Lake Gabbro. The ore deposit is hosted by the Two Duck Lake Gabbro, with the sulphide mineralization predominately disseminated and sparsely distributed throughout this rock type. Sulphide minerals principally consists of pyrrhotite [$\text{Fe}_{(1-x)}\text{S}$] and chalcopyrite [CuFeS_2], and to a lesser extent bornite [Cu_5FeS_4], pentlandite [$(\text{Fe},\text{Ni})_9\text{S}_8$], marcasite [FeS_2] and pyrite [FeS_2] (P & E, 2007). The palladium-platinum-gold ore is associated with the sulphide mineralization (chalcopyrite and pyrrhotite) in the Two Duck Lake Gabbro.

2.5 Previous Studies on Geochemistry

Prior to current investigations, there were two campaigns of acid-base accounting (ABA) sampling and analyses as follows:

- 2001 – B.C. Research Inc. (BC Research) completed an ABA study for Geomaque Explorations Ltd. (Geomaque), which included analysis of 25 samples of waste rock (as provided by Geomaque).

- 2005 – N.A.R. Environmental Consultants Inc. (NAR) completed an ABA study for Marathon PGM, which included analysis of 18 waste rock samples.

A summary of the results of the ABA testing by B.C. Research and NAR is included in Section 4.1.3. The previous studies did not include net acid generation testing nor kinetic testing.

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3.0 METHODS

3.1 Sample Selection

Waste Rock

The objective of the waste rock sample collection process was to collect core samples that are spatially and lithologically representative of the major and minor rock units associated with the PGM-Cu deposit. To confirm the environmental representativeness of the selected samples, as well as to develop a working knowledge of the site layout and geology, a site visit was completed by M. Gunsinger and K. Salzsauler (P.Geo.) of Golder Associates. Prior to the site visit, core logs and cross-sections were reviewed and used to select core intervals of interest. After a review of site background information and core logs that were available at the time, two (2) major and four (4) minor rock types, for a total of six (6) rock types, were identified.

The number of samples collected for each rock type is based on the overall abundance of each rock type. The proportion or abundance of each rock type was visually estimated using the available background information, including geology maps, core logs and cross-sections. Based on the rock distribution, a total of 114 samples of rock were collected, from 21 different drill holes. The number of samples per rock type and the estimated proportion of rock is summarized as follows (Table 1):

Major Rock Types:

- Eastern Gabbro (~44–52% of overall rock) – 57 samples (~50% of samples)
- Two Duck Lake Gabbro (~27–29% of overall rock) – 32 samples (~28% of samples)

Minor Rock Types:

- Volcanic (~14–18% of overall rock) – 10 samples (~8% of samples)
- Heterolithic Breccia (~0.3–12% of overall rock) – 6 samples (~6% of samples)
- Syenite (~0.6–4 of overall rock) – 7 samples (~6% of samples)
- Serpentinite (<1% of overall rock) – 2 samples (~2% of samples)

The core logs identified that sub-rock types are evident within each of the above listed major and minor units. However, based on the overall rock types, these sub-rock types are expected to be geochemically similar and are grouped into the generalized rock types for the purposes of the geochemical investigations. Although the discussion in the result sections only refer to the generalized rock types, the sample selection process did consider the estimated proportions of each lithological unit and sub-rock type.

A list of the all the samples collected, along with the drill hole number, depth interval and a general description of the sample is shown in Appendix A. A site plan is shown in Figure 1 that indicates the locations of the drill holes that were used to select the rock samples.

Tailings

Samples of tailings, as provided by SGS Lakefield in Ontario, Canada, under the direction of Marathon's designated metallurgist, were also selected for geochemical analysis (Table 1). A limited quantity of bench-scale rougher-cleaner concentrate (combined) tailings was generated by SGS Research Mineral Services in November 2007. A sample of the supernatant was collected from the combined tailings sample and submitted for water quality analysis by SGS.

In addition to the combined tailings sample, cleaner and rougher tailings samples were produced by SGS from locked cycle testing and variability floatation testing. The six (6) locked cycle test cleaner and rougher tailings samples were combined in different ratios to formulate 6 composite samples that represent a range of sulphide contents. Similarly, the five (5) variability floatation test cleaner and rougher tailings samples were combined in different ratios to formulate 5 composite samples. Although the blending the cleaner and rougher tailings was completed in effort to produce tailings composites with specific sulphide contents, in many cases, the targeted sulphide content was not achieved. However, the locked cycle and floatation tailings composites do represent a range of sulphide contents (0.1–0.8 wt% as S and 0.07–0.3 wt% as S, respectively), and thus achieved the overall objective of blending the tailings.

3.2 Sample collection

Waste Rock

During the site visit, sections of drill core were retrieved from storage and laid out for visual inspection. The lithology was then compared to the core logs to ensure the logs were consistent with the retrieved sections. Once the core log was compared to the retrieved section, small sections of the core (approximately 0.1 to 0.5 m) were collected over, approximately, a 10 m interval. Some samples were collected over shorter or longer intervals depending on the amount of core available and the representativeness of the rock type present in each section of core. Samples were bagged and labelled with a unique sample identifier (ID). The samples were then shipped to SGS Lakefield in Lakefield, Ontario, for geochemical testing. Sections of core that were removed from storage were indicated on the core box with the initials "GC".

Tailings

All samples of tailings were internally submitted by SGS Research Mineral Services to SGS Analytical Services for geochemical testing. Instructions to the laboratory called for the tailings sample to be immediately submerged under process water to maintain saturated conditions and to

prevent oxidation prior to analysis. In addition, the locked cycle and variability floatation composite tailings were blended internally at SGS before being submitted for geochemical analysis.

3.3 Geochemical Testing Program

The geochemical test work completed on the waste rock samples and tailings samples included the following:

- Mineralogy;
- Whole rock and bulk metal analysis;
- Acid-base accounting (ABA);
- Net acid generating (NAG) tests;
- Short-term leach tests (modified SPLP 1312); and
- Kinetic tests.

The following sub-section outlines the details of the testing methods.

3.3.1 Mineralogy

Mineralogical testing was completed on ten (10) waste rock samples (those that were chosen for kinetic testing) and the single tailings sample. The mineralogical analyses included qualitative X-Ray Diffraction and optical microscopy of polished thin sections. Mineralogical analysis was completed to identify the major, minor and trace mineralogical assemblages.

3.3.2 Whole Rock and Bulk Metal Analysis

Whole rock and bulk metal analysis was completed on all 114 samples of rock and the single tailings collected in 2007. Whole rock and bulk metal analyses measure the solid-phase chemical composition of waste rock and tailings. Descriptions of whole rock and bulk metal analyses are summarized as follows:

- Whole rock analysis – measures the concentrations of major oxide species by X-ray fluorescence (XRF) to determine the percentage of the following major elements, reported as oxides: SiO₂, Al₂O₃, Fe₂O₃, CaO, MgO, Na₂O, K₂O, TiO₂, MnO, P₂O₅, Cr₂O₃ and V₂O₅.
- Bulk metal analysis – determines the concentrations of major and trace elements by a multi-acid leach followed by an ICP finish to determine the concentrations of the following elements: Ag, Al, As, Ba, Be, Bi, Ca, Cd, Co, Cr, Cu, Fe, K, Li, Mg, Mn, Mo, Ni, Pb, Sb, Se, Sn, Sr, Ti, Tl, U, V, Y and Zn.

The bulk metal composition provides a basis for comparison between samples of rock and typical crustal abundances. It can also be further used to identify samples that contain greater amounts of elements that have environmental significance. In addition, the results of the bulk metal analyses were used to select candidates for short-term leach testing.

3.3.3 Acid-Base Accounting (ABA)

As part of the 2007 geochemical investigations, ABA was conducted on all 114 rock samples and the single tailings sample. In 2008, ABA was conducted on 11 tailings samples, which included 6 locked cycle test composite samples and 5 floatation variability composite samples.

As part of ABA, bulk quantities of acid generating minerals (e.g., sulphide minerals) and acid neutralizing minerals (e.g., carbonate minerals) are measured to assess whether the materials tested will have sufficient capacity to neutralize the acid potential or if the materials have the potential to generate acidic effluents. The methodology performed on the samples is a modified Sobek method (Sobek et al., 1978) that includes analysis for paste pH, sulphur species (total sulphur, sulphate content and sulphide content), acid potential (AP) and neutralization potential (NP), and carbon species (total carbon and carbonate content).

Paste pH

Paste pH is measured from a mixture of crushed rock or tailings sample and water. Thus, paste pH is used to determine the pH of water that is in contact with the test material and assesses the effects that readily soluble constituents will have on the pH. Paste pH is, therefore, a qualitative indicator of the presence of stored acidity or readily soluble neutralizing minerals (most commonly carbonate minerals).

Acid Potential (AP)

Acid potential is calculated from the sulphide content and assumes that the sulphide minerals are present as pyrite. Sulphide content is used in the calculation of AP because the total sulphur content can over-estimate AP by including non-acid generating forms of sulphur (i.e., sulphate minerals).

Neutralization Potential (NP)

Neutralization potential (NP) is determined by acidifying the sample with sulphuric acid. Following the acidification of the sample, the amount of acid that is consumed during the test period is determined by a reverse titration.

Carbonate neutralization potential (CaNP) is not measured directly, but is calculated from either:

- 1) Total carbon content (wt% as C), or
- 2) Carbonate content (wt% as CO_3).

Using the total carbon to calculate CaNP assumes that all the carbon in the sample is present as calcite [CaCO_3]. Using the carbonate content to calculate the CaNP assumes that all the carbonate is present as calcite.

The difference between the NP and CaNP is that the NP is a “bulk” neutralization potential, whereas CaNP is solely based on the carbon or carbonate content of a sample. In addition to the consumption of acid by readily soluble carbonate minerals, the “bulk” NP incorporates the consumption of acid by less soluble aluminosilicate, silicate or other minerals. Under ambient conditions, the dissolution of these other minerals is typically quite slow. Because the dissolution of aluminosilicate and silicate minerals is kinetically limited, aluminosilicates and silicates are only significant neutralizing minerals under low pH conditions or where water-rock interaction times are long (Blowes et al., 2004). Generally, the CaNP’s are considered to give a more reliable estimate of the material’s ability to consume acid because the CaNP’s represent the neutralization potential based on the dissolution of soluble carbonate minerals.

Supplemental calculations of net neutralization potential (Net NP, also known as the net acid production potential or NAPP), net potential ratio (NP/AP), net carbonate neutralization potentials (Net CaNP) and net carbonate potential ratios (CaNP/AP) were completed to assist in interpreting the results of the ABA analyses. More information on the standard methods of acid-base accounting can be found in Price (1997) or MEND (2005).

3.3.4 Net Acid Generating (NAG) Tests

Net acid generating (NAG) test were completed on eighteen (18) samples of waste rock and twelve (12) samples of tailings. Along with ABA, NAG is used as a tool to classify acid generating or non-acid generating materials. The method consists of adding hydrogen peroxide to the sample to induce complete oxidation of the sulphide minerals in the sample. The acid produced as a result of sulphide oxidation reacts with neutralizing minerals. Once the oxidation reaction is complete, the final pH is measured. In addition, the acidity is measured at two distinct pH values by titrating to a pH of 4.5 and 7.0. The titration determines the amount of acidity (kg H_2SO_4 /tonne) with respect to an acidic and a neutral pH value. Thus, the acidity values at pH 4.5 and 7.0 provide an indication of whether the sample will produce enough acidity to drop the pH below 4.5 and 7.0, respectively. If the material has sufficient neutralization potential to maintain near-neutral pH conditions, then there will be no detectable acidity at pH 4.5 and limited to negligible amounts of acidity at pH 7.0. Detectable acidity at pH of 4.5 suggests that significant amounts of acidity may be released and in proportions that will likely result in the generation of acidic effluents.

Before the titrations to determine the acidity were completed, the concentrations of sulphate and metals in the NAG supernatant were measured. The NAG supernatant water quality represents concentrations resulting from conditions of rapid and complete oxidation of all the sulphide minerals present in the sample. Thus, the NAG supernatant chemistry can be used to assist in formulating a water quality for waste rock and tailings effluent under fully oxidized conditions (often considered worst case) from samples with a range of sulphide contents.

3.3.5 Short-term Leach Tests

Short-term leach testing was completed on forty one (41) samples of rock and on the single, 2007 tailings sample. The samples of rock were selected from the overall sample set to represent a range of available rock types. The leach tests were completed to measure the concentrations of constituents in the sample leachate that are readily soluble. The leach testing method is a modified Synthetic Precipitation Leaching Procedure (U.S.EPA, 1998), whereby a standard dilute sulphuric/nitric acid solution at a pH of 4.2 was added to the sample solids and thoroughly mixed for 18 hours. The procedure used is called a 'modified' SPLP leach test because the liquid to solid ratio was adjusted from 20:1 to 3:1 to limit dilution and to better identify potential parameters of concern. Information from leach testing is useful in developing initial estimates of metal leaching from different rock types. In addition, the results of the leach testing were used along with the results of the ABA and bulk metal analyses to select candidates for kinetic testing.

3.3.6 Kinetic Tests

Kinetic testing or humidity cell testing was completed on ten (10) samples of waste rock and on the single combined (average ore grade) tailings sample. A humidity cell is a weathering chamber designed to provide simple control over air, temperature and moisture, while allowing for the removal of weathering products (principally oxidation products) in solution. For the kinetic testing, a standard humidity cell procedure as described in ASTM D5744-96 Standard Test Method for Accelerated Weathering of Solid Materials Using a Modified Humidity Cell (ASTM, 2001) was implemented. Kinetic testing provides the fundamental data necessary to complete a preliminary evaluation of reaction rates for acid generating minerals, reaction rates for neutralizing minerals, metal leaching rates, mass loading rates and possible water quality implications as a result of oxidation of mine wastes.

Samples are placed in a humidity cell and immediately rinsed. The effluent from the initial rinse is collected and analyzed. This initial flush is known as "week 0". Kinetic testing continues by subjecting the samples to a 6 day cycle of dry and humid air: 3 days of dry air and 3 days of humid air, followed by a flush with water on the 7th day. The 7th day flush is the end of "week 1" and the process is repeated. The effluent was then collected from the bottom of the humidity cell and analyzed for general parameters, including pH, acidity, alkalinity, conductivity, sulphate, iron and calcium, and a suite of metals.

3.3.7 Water Quality Modeling

Water quality modeling was completed to estimate the water quality of mixed drainage consisting of effluents from tailings and waste rock. The geochemical speciation model PHREEQC was used to perform the mixing cell calculations. Further information on PHREEQC is provided in Parkhurst and Appelo (1999) and USGS (2008).

Mixing calculations were completed by combining the expected water quality of tailings drainage with the expected water quality of waste rock drainage. The volumetric mixing fractions (i.e., ratio at which the two water qualities were mixed) at which the two water qualities were mixed is based on the proportion of tailings and waste rock runoff flow rates relative to the total mine waste runoff flow rate. The proportion of the tailings runoff and waste rock runoff relative to the total mine waste runoff is based on the site water balance at the end of mining operations. During the final year of operations, runoff from the tailings represents 49% of total mine waste runoff and runoff from the waste rock represents 51% of the total mine waste runoff (annual flow rates for tailings and waste rock runoff are 116,036 m³/mon and 119,872 m³/mon, respectively, based on site water balance) (Golder, 2008).

Based on the static test results, a proportion of the waste rock is expected to be acid generating (approximately 7%, based on samples analyzed). To estimate conditions in the field after several years of oxidation, the waste rock effluent is assumed to consist of 93% neutral rock drainage (NRD) and 7% acid rock drainage (ARD). Overall, there are three components to the model: 1) tailings effluent, 2) NRD waste rock effluent, and 3) ARD waste rock effluent.

The proportions at which the effluent water quality for the tailings, NRD waste rock and ARD waste rock were mixed are as follows:

- Tailings – 49%;
- NRD waste rock – 47.3%; and
- ARD waste rock – 3.70%.

Input effluent water qualities for the tailings, NRD waste rock and ARD waste rock were derived as follows:

- Tailings effluent – calculated from weeks 15 to 20 of humidity cell testing on the combined, average ore grade tailings sample (assumes appropriate management of tailings to eliminate ARD);
- NRD waste rock effluent – calculated from weeks 35 to 40 of humidity cell testing on the samples of major rock types. An average water quality was calculated for rock types with more than one humidity cell. The water quality of the effluent is based on the expected proportions of rock in the waste rock pile as follows: 48% Eastern Gabbro, 28% Two Duck Lake Gabbro, 16% Volcanics, 6% Heterolithic Breccia and 2% Syenite. The proportion or abundance of each rock type was visually estimated by using the available background information, including geology maps, core logs and cross-sections (Table 1);

- ARD waste rock effluent – derived from NAG supernatant chemistries. An average water quality was calculated from samples that are expected to be acid generating. The NAG test data was used because the acidity released from kinetic test samples that are expected to be acid generating have not yet fully consumed the neutralization potential of the samples. Thus, the average NAG test data is considered to better represent an, oxidized water quality.

Two estimates of combined tailings and waste rock effluent water qualities were calculated: a “mix” and an “equilibrated mix”. The “mix” is the mass balance from mixing cell calculations that includes the loads from the tailings, NRD waste rock and ARD waste rock effluents. The “equilibrated mix” is also calculated from the mass balance from mixing cell calculations, but considers mineral solubility. Thus, the “equilibrated mix” includes controls of dissolved concentrations through the precipitation of secondary minerals typically associated with mine wastes (e.g., ferric oxyhydroxides).

It is important to note that load contributions from other sources, such as runoff from the open pit, runoff from the plant site and tailings process water, were not included in the water quality estimates.

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4.0 RESULTS AND DISCUSSION

4.1 Waste Rock

4.1.1 Mineralogy

The qualitative X-ray diffraction (XRD) results for samples of waste rock are presented in Table 2. Photos of thin-sections from the optical microscopy are shown in Appendix B and the XRD scans are shown in Appendix C.

The XRD results indicate that the predominant mineral in waste rock and tailings is plagioclase. There are also moderate amounts of diopside and quartz in the Two-Duck Lake and Eastern Gabbros. Amphibole and ferropargasite are also observed in moderate to minor amounts in most rock types.

The sulphide mineral assemblage principally consists of pyrrhotite, chalcopyrite and to a lesser extent pyrite. Bornite and covellite [CuS] were also detected in select samples. Minor amounts of calcite [CaCO₃] are present in some rock samples, with ankerite [Ca(Fe,Mg,Mn)(CO₃)₂], dolomite [CaMg(CO₃)₂] and siderite [FeCO₃] also detected. Photographs of examples of the above identified sulphide and carbonate minerals are presented in Appendix B.

4.1.2 Whole Rock and Bulk Metal Analysis

The solid-phase composition of the rock material is measured as a screening level step to identify parameters that may require additional consideration with respect to overall site water quality and management. A statistical summary of the whole rock and bulk metal analyses are presented in Tables 3 and 4, respectively. All the whole rock and bulk metal data is presented in Appendix D.

Overall, the compositions of the major oxides are very similar between lithological groups, with the exception of samples of Syenite that have lower average compositions of MgO (1%) and CaO (5%) and higher average compositions of K₂O (4%) and Na₂O (5%) contents. The solid-phase concentrations of Fe and Mg in samples of Eastern Gabbro, Two Duck Lake Gabbro, and Heterolithic Breccia are generally higher than those in samples of Volcanic and Syenite and Serpentine.

The results of the bulk metal analyses are compared to average crustal abundances for reference, as recommended by Price (1997). This comparison is meant only as a guide at this stage of the geochemical characterization and it should be noted that, as expected for mining properties, some metal concentrations will be elevated relative to crustal abundances. However, elevated concentrations of metals in the solid phase do not necessarily increase the potential for impacts, but rather identifies parameters for further consideration. The notable metals that have average

concentrations observed to be greater than the average crustal abundance, for most rock types, include: Ag, As, Bi, Co, Cr, Cu, Fe, Mn, Ni, Sb, Se, V and Zn.

Of these metals, As, Cu, Co, Cr, Ni and Zn frequently occur above the average crustal abundance as follows:

- Concentrations of arsenic in four (4) samples of Eastern Gabbro (4–26 mg/kg), one (1) sample of Two Duck Lake Gabbro (3 mg/kg), one (1) sample of Volcanic (4 mg/kg), and two (2) samples of Heterolithic Breccia (3–7 mg/kg) are greater than the average crustal abundance (2 mg/kg).
- Concentrations of copper in the majority of samples of Eastern Gabbro (29–6300 mg/kg), Two Duck Lake Gabbro (43–7300 mg/kg), Volcanic (33–3300 mg/kg) and Heterolithic Breccia (79–5700 mg/kg) are greater than the average crustal abundance (60 mg/kg).
- Concentrations of cobalt in the majority of samples of Eastern Gabbro (19–170 mg/kg), Two Duck Lake Gabbro (27–140 mg/kg), Volcanic (16–56 mg/kg) and Heterolithic Breccia (37–180 mg/kg) are greater than the average crustal abundance (25 mg/kg).
- Concentrations of chromium in the majority of samples of Eastern Gabbro (56–1150 mg/kg), Two Duck Lake Gabbro (52–460 mg/kg), Volcanic (75–220 mg/kg) and Heterolithic Breccia (110–290 mg/kg) are greater than the average crustal abundance (102 mg/kg).
- Concentrations of nickel in the majority of samples of Eastern Gabbro (37–1050 mg/kg), Two Duck Lake Gabbro (4–490 mg/kg), Volcanic (42–220 mg/kg) and Heterolithic Breccia (92–580 mg/kg) are greater than the average crustal abundance (84 mg/kg).
- Concentrations of zinc in the majority of samples of Eastern Gabbro (58–280 mg/kg), Two Duck Lake Gabbro (51–230 mg/kg), Volcanic (60–210 mg/kg) and Heterolithic Breccia (66–220 mg/kg) are greater than the average crustal abundance (70 mg/kg).

Frequency diagrams (histograms) were used to assess the sulphide and bulk metals contents of waste rock (Appendix E). The histograms were used to assist in the selection of sample candidates for short-term leach testing and longer term kinetic testing. The histograms can also be used to determine if the concentrations of particular elements in the samples of a lithology are geochemically representative of the lithology. Generally, the histograms for the Eastern Gabbro and Two Duck Lake Gabbro show smooth and complete trends with the greatest frequency skewed toward the median and tails present at the minimum and maximum extremes. As a result of a smaller sample group, the trend observed in the histograms for the Volcanic and Heterolithic Breccia rock types are not as smooth and complete, but still show tails at the extremes. Thus, the histograms for the Eastern Gabbro and Two Duck Lake Gabbro, and to a lesser extent for the Volcanic and Heterolithic Breccia rock types, show that a representative range of solid-phase concentrations has been captured for the majority of parameters. The histograms for Syenite and Serpentinite show the least amount of completeness, but the two rock types only represent a small percentage of the rock at the project site.

The standard deviations are frequently greater than the average for various elements including: Ag, As, Ba, Be, Bi and Cu. Thus, the solid-phase concentrations of many metals are variable and

exhibit the geochemical heterogeneity within each rock type. This is particularly true for Cu that shows a wide range in solid-phase concentrations (15–7300 mg/kg).

4.1.3 Acid-Base Accounting (ABA)

The statistical summary of the ABA results is presented in Table 5 and plotted in Figures 3 to 7. All the ABA data is included in Appendix D. To put the 2007-2008 results presented herein into context, the results of the two previous testing programs are summarized below.

Previous Studies

The results of the 25 samples from the 2001 BC Research testing program (only ABA tests were performed) are summarized as follows:

- Comparing the NP:AP ratios to acid generating criteria shows that 5 samples are “likely” to be acid generating, 3 samples have a “possible” potential to generate acidity and 3 samples have a “low” potential to generate acidity. The acid generating potential of the remaining 14 samples is characterized as “none”, or the acid generation potential is expected to be negligible.
- Therefore, based on 25 samples of rock, approximately 20% of the samples were determined to be “likely” acid generating.

The usefulness of the results from this study is limited as there is no indication of the sample locations and lithologies.

The results of the 18 samples from the 2005 NAR ABA testing program are summarized as follows:

- Sulphide content of 6 of the 18 samples was greater than 0.3 wt% as S (3 of the 6 samples are from the ore zone).
- The acid generation potentials for the different rock zones is summarized as follows:
 - o Hanging wall zone (6 samples) – acid generation potential ranges from “none” to “low”.
 - o Ore zone (7 samples) – acid generation potential ranges from “none” to “likely”.
 - o Foot wall zone (5 samples) – acid generation potential ranges from “none” to “likely”.

Paste pH and Sulphide Content

Results of paste pH and sulphide content can be used as screening tools to assess the potential for acid generation. Materials with a sulphide content less than 0.3% and a paste pH greater than 5.5 have low potential for acid generation (Price, 1997). Paste pH was plotted versus the sulphide content in Figure 3 with reference lines at sulphide contents of 0.3 wt% as S and paste pH values of 5.5.

The plots of paste pH versus sulphide content show that the paste pH values are alkaline in all samples and range from 8.86 to 10.22. No samples had a paste pH less than 5.5. Thus, quantities of readily soluble, stored net acidity are negligible. Statistics calculated for the paste pH data show that the data for each rock type have low standard deviations relative to the mean values. Thus, the range of paste pH values is narrow indicating that there is only a marginal variation in the samples.

The sulphide mineralization is predominately disseminated and sparsely distributed throughout the ore zone and associated rock types. Overall, the sulphide content ranged from <0.01 to 10 wt% as S. The range, average and standard deviation of sulphide contents are summarized by lithology as follows:

- Eastern Gabbro – range: 0.01 to 4 wt% as S; mean: 0.1 ± 0.6 wt% as S.
- Two Duck Lake Gabbro – range: 0.01 to 4 wt% as S; mean: 0.2 ± 0.6 wt% as S.
- Volcanic – range: 0.01 to 10 wt% as S; mean: 2 ± 3 wt% as S.
- Heterolithic Breccia – range: 0.01 to 0.7 wt% as S; mean: 0.3 ± 0.3 wt% as S.
- Syenite – range: 0.01 to 0.1 wt% as S; mean: 0.04 ± 0.05 wt% as S.
- Serpentinite – range: 0.01 to 0.09 wt% as S; mean: 0.05 ± 0.06 wt% as S.

The high sulphide content standard deviation relative to the mean values demonstrates the broad range of sulphide contents in all rock types. The broad range of sulphide contents is particularly true for Eastern Gabbro, Two Duck Lake Gabbro and Volcanic rocks that have sulphide contents ranging over two orders of magnitude.

Although the majority of samples have low sulphide contents, there are several samples with sulphide contents greater than 0.3 wt% as S, including:

- 4 samples of Eastern Gabbro (MAR07-16, MAR07-27, MAR07-99 and MAR07-101);
- 2 samples of Two Duck Lake Gabbro (MAR07-15 and MAR07-107);
- 4 samples of Volcanic (MAR07-33, MAR07-66, MAR07-96 and MAR07-110); and
- 2 samples of Heterolithic Breccia (MAR07-49 and MAR07-100).

Two of these samples, MAR07-15 and MAR07-110, are likely within the ore zone as the concentration of copper across the interval where these samples were collected ranges from 0.3% Cu to 0.6% Cu. Based on the threshold value for sulphide content of 0.3 wt% as S, respectively, the 12 samples listed above have potential for acid generation.

Sulphur Speciation

The sulphide content is plotted as a function of total sulphur in Figure 4. Added to the plot is a 1:1 reference line to assess the speciation of the sulphur minerals in the samples of rock. The sulphur speciation results for all samples show that the distribution of data is very close to the 1:1 reference line; thus, the dominant form of sulphur in the samples is sulphide, presumably contained within sulphide minerals. The sulphur speciation observed in the rock samples is consistent with reports of the ore mineralogy that suggest the host rock contains sulphide mineralization and the absence of sulphate minerals (P & E, 2007).

Carbon Speciation

The concentrations of total carbon (%C) and carbonate (%CO₃) were measured as part of the ABA analyses. The total carbon content ranges from <0.01 to 0.9 wt% as C and the carbonate content ranges from <0.01 to 3 wt% as CO₃. Generally, the concentrations of carbonate follow a similar trend to that of total carbon, with the following lithologies having the highest to lowest average concentrations of carbonate and total carbon: Syenite, Serpentine, Two Duck Lake Gabbro, Volcanic, Heterolithic Breccia and Eastern Gabbro.

As the carbonate values are a better representation of carbonate minerals, the most effective mineral at buffering acidity, CaNP values were calculated using the carbonate content and not total carbon content.

Neutralization Potentials

Carbonate neutralization potential (CaNP) is presented as a function of neutralization potential (Bulk NP or NP) in Figure 5. The ranges of the neutralization potentials for all rock types are listed as follows:

- Bulk NP (NP) – 0 to 120 t CaCO₃/1000 t
- CaNP – 0.08 to 156 t CaCO₃/1000 t

Samples from all rock types show a wide range of NP values, but exhibit a relatively narrow range of CaNP values. To assess the proportion of NP that consists of CaNP, a 1:1 reference line was added to the graph. Where NP is equal to the CaNP, the NP is derived from carbonate minerals. Sample points that are not located on or near the 1:1 reference line have a significant proportion of bulk NP from non-carbonate minerals, such as aluminosilicate and silicate minerals.

Overall, the samples from all rock types show a variable relationship with the 1:1 reference line and are described as follows:

- Most samples of Eastern Gabbro and Heterolithic Breccia are clustered near the x-axis, with a small proportion of samples showing a limited relationship with the 1:1 reference line. Thus, the majority of the samples of Eastern Gabbro and Heterolithic Breccia have neutralization potentials principally derived from non-carbonate minerals, with carbonates contributing only minor to negligible amounts of NP in most samples.
- The neutralization potential data for the Two Duck Gabbro and Volcanic rock types is similar to the data for the Eastern Gabbro and Heterolithic Breccia rock types; the chief exception is the greater percentage of samples that are near the reference line. Thus, the bulk neutralization potential in the Two Duck Lake Gabbro and the Volcanic rocks is principally derived from both carbonate and non-carbonate minerals.
- The neutralization potential data for the samples of Syenite shows a linear pattern that reflects the 1:1 reference line. Thus, a significant proportion of the neutralization potential within the samples of Syenite is likely derived from carbonate minerals.
- The two samples of Serpentinite that were analyzed for ABA characteristics show the neutralization potential principally derived from non-carbonate sources.

Acid Generation Potential

Criteria that have been established to assess the acid generation potential of mine wastes are summarized in Price (1997) and are provided in the chart below. This approach compares the AP and the NP through the use of a ratio, referred to as the neutralization potential ratio (NP/AP). The specific ratio at which materials produce acidity depends on several variables. Some of these variables include: presence and amounts of acid generation and acid neutralization minerals, morphology, crystallinity, grain size, chemical composition, paragenesis, texture, and site-specific exposure conditions.

Criteria, as suggested by Price (1997), for the evaluation of the potential for the generation of acidic conditions uses the bulk NP values to determine NP/AP ratios and is presented as follows:

Potential for Acid Generation	NP/AP Criteria	Notes
None	> 4	Non-acid generating – not expected to generate acidity.
Low	4 to 2	Not potentially acid generating – unless the sulphide minerals are extremely reactive and the NP is insufficiently reactive.
Possibly	2 to 1	Possibly acid generating – if NP is insufficiently reactive or is depleted at a faster rate than sulphide minerals.
Likely	< 1	Likely acid generating – unless sulphide minerals are non-reactive.

A more conservative approach is to apply the same criteria using the CaNP to calculate carbonate neutralization potential ratios (CaNP/AP). This approach is considered more conservative as it only considers the neutralizing capacity provided by the faster acting carbonate minerals, and not the slow dissolution rates of aluminosilicate and silicate minerals.

In addition to the ratios as discussed above, materials with a sulphide-sulphur content less than 0.3 wt% and a paste pH greater than 5.5 are considered non-potentially acid generating (non-AG). Exceptions occur where the rock matrix consists of base poor minerals (e.g., quartz) (Price, 1997). Values of NP and CaNP are plotted versus AP in Figures 6 and 7, respectively. Added to the plots are the criteria used to compare the acid generating and acid neutralization potentials of the samples and a line showing the minimum sulphide content required to generate appreciable acidity (0.3 wt% as S). Table 6 evaluates the acid generation potential of the rock samples by comparing the net potential ratios to the criteria and sulphide content as outlined above.

Based on the sulphide content of the sample and the Bulk NP/AP criteria, the number of acid generating samples is summarized by rock type as follows:

- Eastern Gabbro – of the 57 samples, 2 samples are considered to be acid generating, one sample is possibly acid generating and one sample has low acid generating potential.
- Two Duck Lake Gabbro – of the 32 samples, 1 sample is considered to be acid generating and one sample has low acid generation potential.
- Volcanic – of the 10 samples, 6 samples are considered non-acid generating and 4 samples are considered to be acid generating.
- Heterolithic Breccia – of the 6 samples, one sample is considered to be acid generating, and one sample has low acid generation potential.

The remaining samples of Eastern Gabbro, Two Duck Lake Gabbro, Volcanic and Heterolithic Breccia have relatively low sulphide contents (<0.3 wt% as S) and paste pH values greater than 5.5, thus are considered to be non-acid generating. In addition, all of the 7 samples of Syenite and 2 samples of Serpentinite are expected to be non-acid generating. The Volcanic rock type has the greatest percentage of samples that have potential for acid generation (~40%), followed by Heterolithic Breccia (~33%), Eastern Gabbro (~7%) and Two Duck Lake Gabbro (~6%).

Overall, based on the ABA conducted on 114 samples, it is expected that approximately 7% (8 of 114) of the total rock is expected to be acid generating, if unmitigated. The average sulphide content and NP:AP for all the rock samples are 0.30 wt% as S and 3.80, respectively. Thus, assessing the total sulphide content and total NP estimated to be present in the waste rock pile as a whole suggests that the acid generation potential is low. However, the drainage quality is likely to be strongly influenced by the distribution of acid generating materials throughout the waste rock pile. For example, if the acid generating material is concentrated in “pockets” throughout the pile, acidic and metal-rich waters may locally develop. Acid rock drainage that develops in localized areas of the pile are particularly problematic if these areas are close to or in contact with

preferential flow pathways that will rapidly transport the impacted water through and out of the waste rock pile. Unless a waste rock segregation plan is included in the mine waste management strategies, the acid generating material may impact drainage quality. Therefore, the resulting drainage water quality may reflect a mix of acid rock and neutral rock drainage.

4.1.4 Net Acid Generation (NAG) Tests

The results of the net acid generation (NAG) testing were conducted, according to AMIRA (2002), to assess the acid potential of the samples of waste rock and tailings. As with ABA, NAG test data can assist in evaluating the acid generation/neutralization potential of rock materials. The samples submitted for NAG testing were not selected based on proportional representation of rock types. Rather, for each lithology, the data from the ABA and trace metals analyses data sets were used to select NAG test samples that represent a reasonable range of sulphide and metal contents. The NAG test results do not represent field conditions, but conditions under which all the sulphide minerals in the sample undergo rapid and complete oxidation. As such, the NAG tests can provide useful information on possible oxidized water quality.

The results of NAG testing (i.e., NAG pH and NAG acidity) can be evaluated based on the following criteria (AMIRA, 2002):

NAG pH	NAG Acidity (to pH 4.5) (kg H ₂ SO ₄ / tonne)	Potential for Acid Generation
> 4.5	0	Non-acid forming (NAF).
< 4.5	≤ 5*	Potentially acid forming – low capacity (PAF-LC).
< 4.5	> 5*	Potentially acid forming (PAF).

* The NAG criteria used to specify PAF-LC may vary from site to site (AMIRA, 2002).

The results of the NAG testing are presented in Table 7. Five (5) of the 18 samples have a final pH that is less than 4.5 and acidity values that are greater than 5 kg H₂SO₄/ tonne. Thus, the 5 samples are considered to be potentially acid forming. Two of the 18 samples have a final pH that is less than 4.5 with detectable acidity that is less than 5 kg H₂SO₄/tonne, and thus are considered to be potentially acid forming: low capacity. Overall, the 7 samples that are considered to be potentially acid forming are from the Eastern Gabbro, Two Duck Lake Gabbro and Volcanic rock types as follows:

- Eastern Gabbro – MAR07-16, MAR07-27 and MAR07-101;
- Two Duck Lake Gabbro – MAR07-15 and MAR07-107; and
- Volcanic – MAR07-33 and MAR07-96.

The listed 7 samples are also considered to be acid generating, based on the ABA data, and thus the NAG testing results are generally consistent with the ABA results. Two exceptions are the Eastern Gabbro sample MAR07-99 and the Heterolithic Breccia sample MAR07-49 that have sulphide contents of 0.36 wt% as S and 0.71 wt% as S, respectively. Both of these samples are considered to be possibly acid generating based on ABA results, but are considered non-acid forming based on the NAG testing. The NAG test results, therefore, indicate that some rock with sulphide contents greater than 0.3 wt% as S may be non-acid forming because of the abundance of neutralizing minerals. However, caution needs to be used when interpreting these results as not all rock will have sufficient neutralizing capacity to buffer acidity that can be produced by rocks with sulphide contents near and greater than 0.3 wt% as S.

4.1.5 Short-term Leach Tests

Short-term leach testing is used to determine the concentrations of readily soluble constituents in the sample leachate. Thus, the results of leach tests can be used to develop preliminary knowledge of metal leaching behaviour of specific sample types. It is important to note, however, that the results of short-term leach tests do not directly measure the expected effluent chemistry of the test material under ambient conditions as the tests do not consider ongoing sulphide oxidation. Because the tests are conducted under laboratory conditions, variables, such as sample size, sample volume, test duration and the area of the reaction surface or the water-solid interface, are subjective and may not reflect actual field conditions. Short-term leach testing should therefore be used to qualitatively identify elements that require additional consideration with respect to overall site water quality or management.

The modified SPLP was used to conduct leachate experiments on the rock material. The results of the SPLP tests are summarized and compared to the Provincial Water Quality Objectives (MOEE, 1994) in Table 8. The PWQOs are also summarized in Appendix F. Although it is not practical to directly compare short-term leachate chemistry to PWQOs, these comparisons provide insights (at a screening level) regarding parameters that may require further consideration. All the SPLP data is included in Appendix D. The key parameters associated with the short-term leachate from samples of waste rock are summarized below.

Aluminum

Concentrations of aluminum range from 0.005 mg/L to 1.4 mg/L, with maximum concentrations occurring in the leachate from samples of Eastern Gabbro and Serpentine. Concentrations of aluminum in the leachate of the majority of samples from Eastern Gabbro, Two Duck Lake Gabbro and Heterolithic Breccia are greater than the PWQO (0.015 mg/L). Concentrations of aluminum in the leachate from all samples of Volcanic, Syenite and Serpentine are greater than the PWQO.

Arsenic

Concentrations of arsenic range from <0.0002 mg/L to 0.02 mg/L, with the maximum concentrations occurring in the leachate from samples of Eastern Gabbro. Concentrations of arsenic in the leachate of one sample of Eastern Gabbro (MAR07-99) are greater than the PWQO (0.005 mg/L). Concentrations of arsenic in the leachate of some samples of Two Duck Lake Gabbro, Heterolithic Breccia, Syenite and Serpentine are marginally below or near the PWQO.

Copper

Concentrations of copper range from 0.0004 mg/L to 0.03 mg/L, with the highest concentrations occurring in the leachate from samples of Two Duck Lake Gabbro and Eastern Gabbro. The average concentrations of copper in the leachate of samples of Two Duck Lake Gabbro and Heterolithic Breccia are greater than the PWQO (0.001 mg/L).

Iron

Concentrations of iron range from <0.01 mg/L to 1.6 mg/L, with the highest concentrations occurring in the leachate of samples of Eastern Gabbro. Concentrations of iron in the leachate in some samples of Eastern Gabbro, Two Duck Lake Gabbro, Volcanic, Heterolithic Breccia and Serpentine are greater than the PWQO (0.3 mg/L).

Lead

Concentrations of lead range from 0.0007 mg/L to 0.05 mg/L. Average concentrations of lead in the leachate from the majority of samples from Eastern Gabbro, Two Duck Lake Gabbro, Heterolithic Breccia and Syenite are greater than the PWQO (0.001 mg/L). Although solid-phase concentrations of lead are generally low in most rock types, the results of the short-term leach tests suggest that further consideration of leachate potential of lead will be required.

Vanadium

Concentrations of vanadium range from 0.0003 mg/L to 0.09 mg/L, with the highest concentrations occurring in the Heterolithic Breccia. Concentrations of vanadium in the leachate from several samples of Eastern Gabbro, Two Duck Lake Gabbro, Volcanic, Heterolithic Breccia and Serpentine are greater than the PWQO (0.006 mg/L).

Zinc

Concentrations of zinc range from 0.003 mg/L to 0.07 mg/L. Concentrations of zinc in the leachate from some samples of Eastern Gabbro and Heterolithic Breccia are greater than the PWQO (0.02 mg/L).

Other Parameters

Concentrations of cobalt (0.00004–0.001 mg/L) and molybdenum (0.001–0.06 mg/L) in the leachate from a few samples of Eastern Gabbro are greater than the PWQOs (0.0009 mg/L and 0.04 mg/L, respectively). Concentrations of chromium in the leachate of some samples are elevated relative to the PWQO; however, the average concentration of chromium is below the PWQO (0.001 mg/L) for all rock types except Serpentine. Concentrations of antimony and uranium in the leachate of one sample of Heterolithic Breccia (MAR07-02) and Syenite (MAR07-75), respectively, are greater than the PWQOs (0.02 mg/L and 0.005 mg/L, respectively). All other metals are below the PWQOs.

4.1.6 Net Acid Generating (NAG) Test Supernatant Chemistry

The NAG test supernatant chemistry is presented in Table 9. As with the short-term leachate chemistry, the concentrations of metals in the NAG test supernatant are compared to the PWQOs (MOEE, 1994) to provide insights (at a screening level) regarding parameters that may require further consideration. It is important to note that the NAG supernatant water quality represents concentrations resulting from conditions of rapid and complete oxidation of all the sulphide minerals present in the sample. Thus, the NAG supernatant chemistry often represents worst case water qualities for waste rock effluent; however, these parameters and concentrations must be further evaluated in the context of overall site water management.

The key metals in the NAG supernatant are summarized as follows:

Aluminum

Concentrations of aluminum range from 0.08 mg/L to 20 mg/L, with the highest concentrations occurring in the supernatant from samples of Volcanic, Eastern Gabbro and Two Duck Lake Gabbro. Concentrations of aluminum are greater than the PWQO (0.015 mg/L) in all rock samples submitted for NAG testing.

Copper

Concentrations of copper range from 0.0008 mg/L to 43 mg/L, with the highest concentrations occurring in the supernatant from samples of Eastern Gabbro and Two Duck Lake Gabbro. The magnitude of the concentrations of copper is associated with the sulphide content, with the lower concentrations from samples with lower sulphide contents and higher concentrations from samples with higher sulphide content. Concentrations are also high in the two samples of volcanic rock (11–27 mg/L) and are greater than the PWQO (0.001 mg/L) in the majority of samples submitted for NAG testing.

Iron

Concentrations of iron range from 0.01 mg/L to 228 mg/L, with the highest concentrations occurring in the supernatant from samples of Volcanic, Eastern Gabbro and Two Duck Lake Gabbro. The concentrations of iron are strongly associated with the sulphide content. Although the concentrations are very high in select samples, the majority of the samples submitted for NAG testing have concentrations of iron in the NAG supernatant below the PWQO (0.3 mg/L).

Nickel

Concentrations of nickel range from <0.0001 mg/L to 3.8 mg/L, with the highest concentrations occurring in the supernatant from samples of Eastern Gabbro, Two Duck Lake Gabbro and Volcanics. The concentrations of nickel in the NAG supernatant are generally below PWQO, except for samples that have relatively high sulphide contents (>0.5 wt% as S).

Zinc

Concentrations of zinc range from 0.001 mg/L to 3.3 mg/L, with the highest concentrations occurring in the supernatant from samples of Eastern Gabbro, Two Duck Lake Gabbro and Volcanics. As with the concentrations of copper, nickel and iron, the concentrations of nickel in the NAG supernatant are associated with the sulphide content.

Other Parameters

To a lesser extent, the concentrations of Ag, B, Be, Cd, Co, P, Pb, Tl, U and V are elevated in the NAG test supernatant. All other metals are generally low and are expected to be below PWQOs. In addition, the concentrations of sulphate are elevated in the NAG supernatant (<5–110 mg/L).

Overall, the concentrations of metals in the NAG supernatant do not seem to be linked to specific rock types. Rather, the highest concentrations of metals, specifically some of the key metals (i.e., Cu, Fe, Ni and Zn), are observed in the NAG supernatant from samples with relatively higher sulphide contents (i.e., >0.3 wt% as S). It is important to note that the concentrations of metals in the NAG supernatant from samples with lower sulphide contents (<0.3 wt% as S) were also elevated (i.e. >PWQO) for select metals, including Al, Cu and Zn. Thus, the NAG supernatant chemistry suggests that rock with low sulphide contents can generate elevated concentrations of metals, assuming that the rock is rapidly oxidized and all sulphide minerals are available for oxidation. The NAG testing also indicates that effluents from rock with higher sulphide contents will have more of an influence on the overall site water quality, as compared to leachate from rock with relatively lower sulphide contents. However, the weathering rates under actual field conditions will not be as rapid as those simulated through NAG testing. In addition, not all sulphide minerals will be available for oxidation as a significant proportion of the sulphide content will be present within the matrix of the waste rock material and not on or near the surface

where oxidation reactions occur. The NAG test results should only be used within the context of an overall site water quality assessment.

4.1.7 Kinetic Testing

Currently, the humidity cells for the 10 waste rock samples have been operating for 56 weeks and are currently ongoing. The samples submitted for kinetic testing were not selected based on proportional representation of rock types. Rather, for each lithology, the data from the ABA and trace metals analyses data sets were used to select samples that represent a reasonable range of rock types and sulphide contents. The kinetic test samples along with the rock type and initial sulphide content are summarized as follows:

- MAR07-18 – Eastern Gabbro, 0.09 wt% as S;
- MAR07-99 – Eastern Gabbro, 0.36 wt% as S;
- MAR07-16 – Eastern Gabbro, 4.02 wt% as S;
- MAR07-98 – Two Duck Lake Gabbro, 0.01 wt% as S;
- MAR07-80 – Two Duck Lake Gabbro, 0.19 wt% as S;
- MAR07-15 – Two Duck Lake Gabbro, 3.52 wt% as S;
- MAR07-33 – Volcanic, 1.63 wt% as S;
- MAR07-96 – Volcanic, 6.30 wt% as S;
- MAR07-49 – Heterolithic Breccia, 0.71 wt% as S; and
- MAR07-92 – Syenite, 0.01 wt% as S.

Humidity cell MAR07-92 was terminated at week 27 following evaluation of the data at that time. The available kinetic test data for waste rock is presented in Figures 8 through 17 for select parameters. The data is compared to Provincial Water Quality Objectives (PWQOs; MOEE, 1994) and Municipal/Industrial Strategy for Abatement (MISA) effluent discharge limits (MISA, 1994). The PWQOs and MISA discharge limits are summarized in Appendix F. In the previous sections, comparisons of PWQO to the short-term leachate and NAG test supernatant chemistry utilized the lowest PWQO value for parameters that have different PWQOs depending on the water chemistry. However, for the case of the kinetic test results, the PWQOs that were compared to the concentrations in the humidity cell effluent are the values that related to specific water chemistries. For example, the PWQO for aluminum depends on pH and the PWQO for cadmium and copper depends on hardness. The PWQO of 0.075 mg/L for aluminum was used for comparison for the kinetic results because the pH of the humidity cell leachates are near-neutral

(>6.5–9.0). Furthermore, the PWQOs of 0.0001 mg/L and 0.001 mg/L for cadmium and copper, respectively, were used because the hardness of the kinetic test effluents are typically low in the kinetic test effluent (<20 mg/L as CaCO₃).

The key observations from kinetic testing data for the samples of waste rock are as follows:

- Effluents from all samples generally have near-neutral pH values (6.5–8.5). Over the first 10 weeks, most samples had pH trends that were decreasing over time. From week 10 to week 56, the pH values of most samples were comparably stable, except for sample MAR07-98, which has pH values gradually decreasing until week 25 and have stable pH values from week 25 to week 56. The pH of the effluent during the first 56 weeks was outside the MISA (6.0 – 9.5) and PWQO (6.5 – 8.5) ranges for the following samples:
 - o MAR07-99 – during week 2 and 29, the pH values (8.7 and 9.3, respectively) were higher than the PWQO upper value, and during week 30 the pH value (5.1) was less than the lower values of both PWQO and MISA;
 - o MAR07-16 – during weeks 27, 42, 43 and 48, the pH values (6.2, 6.4, 6.4 and 6.4, respectively) were less than the lower value of PWQO, during week 29 and 33 the pH values (5.7 and 4.1, respectively) were less than the lower values of both PWQO and MISA. However, the low pH value during week 33 could be the result of a lab error because the value does not follow the overall trend;
 - o MAR07-98 – during weeks 0 to 13, the pH (7.5–9.6) was intermittently greater than the PWQO upper value and greater than the MISA upper limit during week 4 (9.6);
 - o MAR07-80 – during weeks 17, 29, and 30, the pH values (6.2, 6.3, and 6.2, respectively) were less than the lower PWQO value and during week 27 the pH (4.4) was less than the lower values of both PWQO and MISA. However, the low pH value during week 27 could be the result of a lab error because the value does not follow the overall trend;
 - o MAR07-33 – during week 30, the pH (6.3) was less than the PWQO lower value;
 - o MAR07-96 – during weeks 16 and 43, the pH values (6.2 and 6.4, respectively) were less than the PWQO lower value and during weeks 27, 29, 33 and 34, the pH values (5.9, 5.9, 5.8 and 5.8, respectively) were less than the lower values of both PWQO and MISA;
 - o MAR07-49 – during week 22, the pH (6.2) was less than the PWQO lower value, and during week 27, the pH (5.8) was less than the lower values of both PWQO and MISA;
 - o MAR07-92 – during week 21, the pH (4.9) was less than the PWQO lower value and less than the MISA lower limit, and during week 27, the pH (6.1) was less than the PWQO lower value; and
- Concentrations of most metals generally decrease and stabilize over time and all are below MISA limits. However, concentrations of some metals (e.g., aluminum, arsenic, cadmium, copper and uranium) were observed to be greater than Provincial Water

Quality Objectives (PWQO; MOEE, 1994). Concentrations of metals that were observed to be greater than PWQOs are summarized by metal below:

Aluminum (PWQO = 0.075 mg/L)

- MAR07-18 – concentrations of aluminum (0.09–0.29 mg/L) are greater than the PWQO from week 15 to 56;
- MAR07-98 – concentrations of aluminum are greater than the PWQO during weeks 0 and 10 (0.09 and 0.08 mg/L, respectively).

Arsenic (PWQO = 0.005 mg/L, MISA = 0.5 mg/L)

- MAR07-18 – the concentration of arsenic during week 10 (0.01 mg/L) is greater than the PWQO;
- MAR07-99 – concentrations of arsenic (0.0013–0.04 mg/L) are near or greater than the PWQO from week 0 to 56;
- MAR07-98 – the concentration of arsenic during week 5 (0.007 mg/L) is greater than the PWQO.

Cadmium (PWQO = 0.0001 mg/L)

- MAR07-16 – the concentration of cadmium measured during week 5 (0.0005 mg/L) is greater than the PWQO.

Copper (PWQO = 0.001 mg/L, MISA = 0.3 mg/L)

- All waste rock humidity cells had concentrations of copper in the effluent that, at some point during the first 56 weeks of testing, was greater than the PWQO;
- Concentrations of copper were consistently high in the effluent from the kinetic samples that have relatively higher sulphide contents (>0.3 wt% as S). The key samples to note that have consistently high concentrations of copper are as follows:
 - o MAR07-99 – <0.0005–0.0029 mg/L;
 - o MAR07-16 – 0.0006–0.011 mg/L;
 - o MAR07-80 – 0.0014–0.0026 mg/L;
 - o MAR07-15 – 0.0010–0.0071 mg/L;
 - o MAR07-33 – 0.0011–0.0042 mg/L;
 - o MAR07-96 – 0.0016–0.010 mg/L;
 - o MAR07-49 – 0.0009–0.0033 mg/L.

Uranium (PWQO = 0.005 mg/L)

- MAR07-92 – concentration of uranium during week 2 (0.0054 mg/L) is marginally greater than the PWQO.

Concentrations of sulphate and acidity are higher in the humidity cells with samples that are expected to be acid generating, including MAR07-16, MAR07-99, MAR07-15, MAR07-96, MAR07-33 and MAR07-49. The relatively high concentrations of sulphate and acidity indicate that sulphide oxidation reactions are occurring. Furthermore, although the pH of the effluent remains near-neutral for all humidity cells, the concentrations of some metals are greater than PWQOs, which indicates that metal mobilization can occur under near-neutral conditions.

Depletion Calculations

To evaluate the rate of consumption (or depletion) of acid producing minerals, as compared to the rate of consumption of neutralizing minerals, calculations were completed that are based on geochemical and mineralogical properties of the rock. Depletion calculation details are provided in Price (1997). If the acid producing minerals become depleted before the soluble neutralizing minerals, then it is likely that a long-term non-ARD chemistry will prevail. Conversely, if the soluble neutralizing minerals become depleted before the acid producing minerals, then acidic waters, which are favourable for metal leaching, will dominate. Evaluation of initial mineral contents and comparing the time to depletion for sulphide minerals with the time to depletion for neutralization potential (NP) provides an indication on whether the acidic conditions will develop.

Preliminary depletion rates were completed, whereby the mass of sulphide and neutralizing minerals was calculated from the leachate chemistry on a weekly basis. From these preliminary calculations, a depletion rate was derived using the last 5 weeks of the 56 week test period. Multiple depletion rates for NP were calculated based on calcium, sulphate and alkalinity production rates.

The preliminary depletion calculations are presented in Table 10. Overall, the depletion calculations are in agreement with the ABA and NAG test results. Samples with a sulphide content of 1.6 wt% as S or greater (MAR07-16, MAR07-15, MAR07-33, MAR07-96) were calculated to be acid generating (i.e., the depletion time of neutralization potential is shorter than that of sulphide content). The acid generation potential for samples with sulphide contents ranging from 0.2 to 0.7 wt% as S (MAR07-18, MAR07-99, MAR07-80) are uncertain and depend on the depletion calculation method. The other samples (MAR07-98, and MAR07-92) have depletion times of neutralization potential that are longer than that of sulphide content for all calculation methods.

4.2 Tailings

4.2.1 Mineralogy

The qualitative X-ray diffraction results for the combined tailings sample are presented in Table 11. The tailings mineralogical composition is similar to the parent waste rock with major

amounts of plagioclase, moderate diopside and minor and trace amounts of clays, micas and magnetite. The main difference between the tailings and waste rock mineralogy is the low amounts of sulphide minerals that predominately consist of pyrrhotite with trace amounts of pyrite. The carbonate minerals observed in the combined tailings sample consist mostly of calcite with lesser amounts of dolomite and ankerite.

4.2.2 Whole Rock and Bulk Metal Analysis

A summary of whole rock and bulk metal results of a rougher-cleaner combined tailings is presented in Tables 12 and 13, respectively. The major oxides of the tailings are similar to the other waste rock lithologies, with the exception of syenite.

The results of the trace metals were compared to average crustal abundance, as presented in Price (1997). Concentrations of antimony, arsenic, bismuth, chromium, cobalt, copper, iron, manganese, molybdenum, nickel, selenium, silver, strontium, vanadium and zinc are greater than crustal abundances. Of these parameters, the following is important to note:

- Concentrations of antimony in the tailings sample is 5 times greater than the crustal abundance; and
- Concentrations of bismuth, molybdenum and selenium have concentrations 10 or more times greater than the average crustal values.

4.2.3 Acid Base Accounting (ABA)

One rougher-cleaner combined tailings sample, six locked cycle test tailings composite samples, and five variability flotation test tailings composite samples were tested for ABA. The results are provided in Table 14.

Paste pH and Sulphide Content

Paste pH was plotted versus the sulphide content in Figure 18 with reference lines at sulphide content of 0.3 wt% as S and at paste pH value of 5.5. The paste pH of all 12 tailings samples are alkaline ranging from 8.26 to 8.82. No samples had a paste pH less than 5.5. Thus, quantities of readily soluble, stored net acidity are negligible. The sulphide content range from 0.07 to 0.82 wt% as S. Two locked cycle test composite samples (LCT5 and LCT6) and one variability flotation test composite sample (F089) have sulphide contents (0.44, 0.82 and 0.31 wt% as S, respectively) greater than 0.3 wt% as S.

Sulphur Speciation

The sulphide content is plotted as a function of total sulphur in Figure 19 with a 1:1 reference line to assess the sulphur speciation in the tailings samples. Data of all samples are closer to the 1:1

reference line than to the abscissa, so sulphide is the dominant sulphur species. The data of locked cycle test composite samples are closer to the 1:1 reference line than those of the combined tailings sample and variability floatation test composite samples. Thus, the locked cycle test tailings composite samples generally have a higher proportion of total sulphur consisting of sulphides as compared to the variability floatation test tailings composite samples. Overall, the variability floatation test tailings composites have a higher sulphate content relative to the other tailings samples.

Carbon Speciation

The total carbon content ranges from 0.06 to 0.13 wt% as C and the carbonate content ranges from 0.17 to 0.48 wt% as CO_3 . About 50 to 75% of total carbon is carbonate. There is no distribution difference between the rougher-cleaner combined tailings sample, locked cycle test composite samples and variability floatation test composite samples.

Neutralization Potentials

Carbonate neutralization potential (CaNP) is presented as a function of neutralization potential (Bulk NP or NP) in Figure 20 with a 1:1 reference line. The range of the neutralization potentials for all rock types are listed as follows:

- Bulk NP (NP) – 20 to 28 t CaCO_3 /1000 t
- CaNP – 2.8 to 8.0 t CaCO_3 /1000 t

All samples show a narrow range of both NP and CaNP values. The data are closer to the abscissa than the 1:1 reference line, indicating most bulk NP comes from non-carbonate minerals, such as aluminosilicate and silicate minerals.

Acid Generation Potential (AP)

The ranges of the acid potential are listed as follows:

- Combined tailing sample – 3.1 t CaCO_3 /1000 t
- Locked cycle test tailings composite samples – 3.1 to 25.6 t CaCO_3 /1000 t
- Variability floatation test tailings composite samples – 2.2 to 9.7 t CaCO_3 /1000 t

Variability floatation test tailings composite samples have higher values and wider ranges of AP than those of the combined tailings sample and variability floatation test tailings composite samples.

Acid generation potential vs. neutralization potential is plotted in Figure 21 and acid generation potential vs. carbonate neutralization potential is plotted in Figure 22 and compared to the Price (1997) criteria as outlined in Section 4.1.3. Two of the six locked cycle test samples are

considered to be “possibly” acid generating based on the NP/AP. In addition, five of the six locked cycle test tailings composite samples and three of the five variability floatation tailings composite samples are considered to be “likely” acid generating based on the CaNP/AP. Overall, based on the sulphide content of the sample and the net potential ratios (NP/AP), the samples LCT5 and LCT6 are “possibly” acid generating and sample F089 is considered to have a “low” acid generation potential.

4.2.4 Net Acid Generation (NAG) Tests

Net acid generation (NAG) tests were conducted on the 12 tailings samples. The final pH and NAG acidity values at pH 4.5 and 7.0 are presented in Table 15. Similar to the waste rock NAG results, the tailings NAG test results were evaluated based on the criteria as outlined in Section 4.1.4 (AMIRA, 2002).

No samples are considered to be simply acid forming, as the NAG acidity is below 5 kg H₂SO₄/tonne for all samples. However, 4 of the 12 samples have final pH values (3.53–4.23) less than 4.5 and non-zero NAG acidity values (2.6–4.8 kg H₂SO₄/tonne) that are less than 5 kg H₂SO₄/tonne. Thus, 4 of the 12 samples are potentially acid forming: low capacity. The four samples are as follows:

- Locked cycle test tailings composite samples – LCT3, LCT4 and LCT6 ;
- Variability floatation test tailings composite samples – F089.

Of the 4 listed samples considered to be acid generating by NAG testing, only two (LCT6 and F089) are considered to be acid generating based on the ABA data. The other two samples (LCT3 and LCT4) have sulphide contents (0.23 and 0.25 wt% as S, respectively) that are below the 0.3 wt% as S criteria. The NAG testing of the tailings suggests therefore that tailings with sulphide contents near or greater than 0.2 wt% as S can generate acidic conditions, if the sulphides are rapidly oxidized. The weathering rates under actual field conditions will not be as rapid as those simulated through NAG testing.

4.2.5 Decant Water Analysis

An analysis of the decant tailings water, that was provided with the generation of the tailings solids, was also performed. The decant water analysis is useful because it can be used as a preliminary estimate of process water chemistry associated with tailings deposition. The total and dissolved concentrations are presented in Table 16.

Total concentrations of aluminium, arsenic, cadmium, chromium, cobalt, copper, iron, lead, molybdenum, nickel, silver, vanadium and zinc were greater in comparison to the PWQO's with aluminium, iron, lead, copper and zinc with concentrations far greater than the PWQOs. Concentrations of dissolved metals were significantly lower with only aluminium, chromium,

iron, molybdenum and zinc concentrations greater than the PWQO's. Concentrations above PWQO should be evaluated in the context of overall site water management.

4.2.6 Short-term Leach Tests

The results of the short-term leaching testing are presented in Table 17. Concentrations of aluminum, boron, chromium, cobalt, copper, iron, lead, silver, vanadium and zinc are greater than PWQO's. The short-term leach testing of the combined tailings sample, therefore, indicates that several metals may be present in the tailings effluent at concentrations that require further consideration with respect to overall site water quality and management.

4.2.7 Net Acid Generating (NAG) Test Supernatant Chemistry

The NAG test supernatant chemistry for the 12 tailings samples are presented in Table 18. As with the short-term leachate chemistry, the concentrations of metals in the NAG test supernatant are compared to the PWQOs (MOEE, 1994) to provide insights (at a screening level) regarding parameters that may require further consideration. Furthermore, as with the NAG testing on the samples of waste rock, the NAG supernatant water quality represents concentrations resulting from conditions of rapid and complete oxidation of all the sulphide minerals present in the sample.

The key metals, with concentrations in the NAG supernatant that are greater than PWQOs in the majority of samples, are summarized as follows:

- Aluminum – <0.01 mg/L to 1.54 mg/L;
- Cadmium – 0.000004 mg/L to 0.003 mg/L;
- Cobalt – 0.0001 mg/L to 0.3 mg/L;
- Chromium – 0.002 mg/L to 0.08 mg/L;
- Copper – 0.0007 mg/L to 2 mg/L;
- Nickel – <0.0001 mg/L to 1 mg/L; and
- Zinc – <0.001 mg/L to 0.8 mg/L.

The NAG testing of the tailings suggests therefore that tailings with sulphide contents near or greater than 0.1 wt% as S can generate metal-rich waters, if the sulphides are rapidly oxidized. However, under field conditions the oxidation reactions are slower, and thus the NAG test results represent worst case water qualities under aerobic conditions. Depending on the waste management practices, the water qualities represented by the NAG results may not be present on site; thus, the values need to be evaluated in the context of the overall site water management.

4.2.8 Kinetic Testing

The kinetic testing was conducted only on the rougher-cleaner combined tailings sample (MAR07-Tailings). Based on the first 36 weeks of kinetic testing, the key observations for the sample of tailings are as follows:

- Effluent from the tailings humidity cell is alkaline to near-neutral with most pH values within the range of 7.1 - 8.0. The pH during week 0 (8.9) is greater than PWQO upper value (8.5), and the pH during week 14 (6.2) is less than PWQO lower value (6.5).
- Concentrations of acidity are below detection limit (<1 mg/L as CaCO_3).
- Concentrations of alkalinity oscillated between 10 mg/L to 50 mg/L during the first 36 weeks.
- Concentrations of sulphate during weeks 0 and 1 were relatively high (up to 88 mg/L), decrease sharply during weeks 2 and 3, and then stabilized to a concentration of approximately 10 mg/L over time. The high concentrations during the early weeks may be a result of: 1) release from sulphide oxidation reactions, 2) a flush of process water from the tailings sample, or 3) the dissolution of soluble sulphate minerals (i.e., gypsum [$\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$]).
- Concentrations of metals are generally decreasing over time and are below MISA limits. However, concentrations of aluminum, copper and molybdenum were observed to be greater than PWQO (MOEE, 1994):
 - Concentrations of aluminum (0.02–0.13 mg/L) are frequently greater than or near the PWQO (0.075 mg/L);
 - Concentration of copper at week 0 and week 10 (0.0013 and 0.0041 mg/L, respectively) are greater than the PWQO (0.001 mg/L);
 - Concentrations of molybdenum, during weeks 0, 1 and 2 (0.054–0.088 mg/L), are greater than the PWQO (0.04 mg/L), but decrease to below the PWQO from week 5 to week 35;
 - Concentrations of other metals are below PWQOs.

Depletion Calculation

The depletion times of neutralization potential of MAR07-Tailings humidity cell are longer than the depletion times of the acid potential (Table 10). Thus, as with the static test and NAG results, the depletion calculations suggest that the combined (average ore grade) tailings sample is non-acid generating.

4.3 Water Quality Modeling

Water quality modeling consisted of mixing calculations to estimate the long-term, steady state water quality of mixed drainage consisting of effluents from tailings, NRD waste rock and ARD

waste rock. Input effluent water qualities for the tailings, NRD waste rock and ARD waste rock are summarized in Table 19. The results of the water quality estimates are shown in Table 20.

Based on the water quality estimates of the mixed waste rock and tailings effluent, the key results are as follows:

- The equilibrated mixture of tailings and waste rock effluent is expected to have a near neutral pH (7.88), due to the moderate concentrations of alkalinity (~20 mg/L as CaCO_3).
- Concentrations of alkalinity are expected to be sufficient to buffer the acidity produced by acid generating rock. However, if the alkalinity is lower than expected, the non-equilibrated mixture of tailings and waste rock effluent suggests that the drainage from the mine wastes may become acidic (pH~3.69).
- Concentrations of cadmium, cobalt, copper, iron, nickel and zinc are expected to be elevated in the mixed tailings and waste rock effluent (i.e., >PWQOs), despite the near-neutral pH conditions. In addition, concentrations of aluminum are likely to be elevated, but are expected to decrease as a result of precipitation and sedimentation processes. Concentrations of other metals are expected to be low (i.e., below PWQO).

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5.0 LIMITATIONS

This document is provided for the information of Micon International Ltd. and Marathon PGM Corporation only. Third party reliance on the information provided in this document is at the sole risk of the third party. The document is not for publishing or to be presented in part or in whole in a public context, such as in a feasibility study, which will be used by the public for the purposes of investing, as such, costs do not include certification of the document under National Instrument 43-101 (NI 43-101). Should certification of the document be required, then a written request from the site owner (Marathon PGM Corporation) would be required and additional scope and cost may result, which are not currently included.

This report is based on a geological data set. Conditions between sampling points may vary. Should observations between sampling points differ from those anticipated based on the current data set, additional evaluation would be necessary, which may result in changes to the conclusions and recommendations of this report.

The water quality modeling has limitations, including:

- Inflows to the mine waste management areas from natural watershed sources (i.e., direct precipitation, natural runoff and groundwater seepage) are not included in the calculations;
- Other significant load sources, such as open pit runoff, plant site runoff or tailings process water are not included in the calculations; and
- Adsorption or biological processes (i.e., biodegradation, attenuation) that may be controlling concentrations in solution are not included in the model.

It is important to note that load contributions in addition to the tailings and waste rock effluents, such as runoff from the open pit, runoff from the plant site and tailings process water, will influence the overall site water quality. Thus, as the project progresses, additional water quality estimates should be completed to further assess the water quality implications from other site aspects (i.e., open pit and process waters).

All models are just estimations of projected site conditions based on a limited data set. Site monitoring is required as the project progresses and should be used to routinely update water quality estimates. Adaptive management based on monitoring data and updated water quality estimates will be required as the project progresses.

6.0 CONCLUSIONS AND RECOMMENDATIONS

Based on our current understanding of the site geology and deposit, the key conclusions related to the geochemical and mineralogical characteristics of the waste rock are as follows:

- Mineralogical analysis of the rock samples indicates that the principal mineralogical assemblage consists of plagioclase, and to a lesser extent diopside, quartz and amphibole. Sulphide minerals predominately consist of pyrrhotite, chalcopyrite and pyrite, and carbonate minerals (i.e., calcite and dolomite) were detected in trace amounts.
- Acid-base accounting (ABA) results show that the majority of the rock samples collected are not expected to be acid generating. However, based on the overall quantities of sulphide minerals observed, it is possible that acid generating conditions could develop in the overall pile, if sufficient NP is not provided by the non-carbonate minerals and the oxidation processes are not mitigated. Based on samples with a sulphide content greater than 0.3 wt% as S, the Volcanic rock type has the greatest percentage of samples that are expected to be acid generating (~40%), followed by Heterolithic Breccia (~33%), Eastern Gabbro (~7%) and Two Duck Lake Gabbro (~6%). Although the acid generation potential of most of the waste rock samples is low, approximately 7% of the samples are considered to be acid generating.
- Net acid generation (NAG) testing results are in general agreement with the ABA results and indicate that the majority of samples are non-acid generating. In addition, the NAG results indicate that some rock with sulphide contents greater than 0.3 wt% as S may be non-acid generating due to the abundance of neutralizing minerals. However, the NAG samples with sulphide contents greater than 0.5 wt% as S have the capacity to generate moderate to highly acidic conditions.
- Short-term leach testing suggests that several metals require further evaluation with respect to implications to the overall site water quality, including Al, Ag, B, Co, Cr, Cu, Fe, Pb, V and Zn.
- In addition to the short-term leach testing, analysis of the NAG supernatant suggests that several metals require further evaluation with respect to implications to the overall site water quality, including Al, Cd, Co, Cr, Cu, Ni, Zn, and to a lesser extent B, Fe, Pb and Tl.
- Concentrations in the kinetic test leachate for the waste rock samples showed that Al, As, Cu, and to a lesser extent Cd and U, occurred at concentrations greater than PWQOs during the 56 week test period.

Tailings

Based on the analysis of the preliminary tailings samples, the key conclusions related to the geochemical characteristics of the tailings are as follows:

- Acid-base accounting (ABA) and net acid generation (NAG) testing suggest that majority of the tailings samples are not expected to be acid generating. However, the NAG test results indicate that tailings with a sulphide content as low as 0.2 wt% as S has the capacity to generate acidic conditions, if the sulphide minerals are rapidly oxidized.
- Short-term leach testing suggests that several metals require further evaluation with respect to implications to the overall site water quality, including Al, Ag, B, Co, Cr, Cu, Fe, Pb, V and Zn.

- In addition to the short-term leach testing, analysis of the NAG supernatant suggests that several metals require further evaluation with respect to implications to the overall site water quality, including Al, Cd, Co, Cr, Cu, Ni, Zn, and to a lesser extent B, Fe, Pb and Tl.
- Concentrations in the kinetic test leachate for the single combined tailings sample (average ore grade) showed that Al, Cu and Mo occurred at concentrations greater than PWQOs at some point during the 36 week test period.
- Water quality analysis of the tailings decant indicates that some metals (i.e., Al, Fe, Mo and Zn) could be present at concentrations above PWQOs in the process water.

Water Quality Modeling

Based on the sample data and water quality estimates of the mixed waste rock and tailings effluent, pH is expected to be near-neutral and concentrations of cadmium, cobalt, copper, iron, nickel and zinc are expected to be above PWQOs in the mixed tailings and waste rock effluent. Furthermore, it is important to note that load contributions from the tailings assume that the sulphide content of the tailings will be 0.1 wt% as S (or less) and (or) assumes appropriate management to prohibit potential ARD from forming in the tailings. In addition, loading sources, such as runoff from the open pit, runoff from the plant site and tailings process water, were not included in the water quality modeling, but will influence the overall site water quality.

Although the majority of waste rock samples do not have acid generating properties, a portion of the waste rock could be potentially acid generating and metal leaching. Depending on the site water balance, flow logic and baseline water quality, and thus the overall site water quality, waters coming into contact with waste rock drainage or tailings effluent may require treatment or settling to reduce the total metal concentrations.

Recommendations

Based on the above results and conclusions, the following recommendations are provided:

- Preparation of a general mitigation plan considering options is recommended. For example, segregation of acid generating materials (high sulphide wastes) into a chemically stable environment (i.e., under non-acid generating tailings or underwater) may be an option that is considered.
- Confirmation and segregation, based on operational monitoring, is recommended for low sulphide material that may be considered for use in construction on-site.
- Results of the short-term, NAG, longer term repetitive leach testing (kinetic testing) and the preliminary water quality estimates should be used in conjunction with the mine plan and other baseline data (e.g., water balance and water quality) to develop estimates of overall site water quality and to develop a site water management plan.
- It is recommended that an evaluation of containment, treatment and discharge options be conducted as well as an evaluation of potential downstream impacts from the release of any water coming in contact with discharge from waste rock pile(s) and tailings management area(s).

Sulphide contents greater 0.1–0.2 wt% as S in tailings may result in the production of acidic and metal-rich waters. Thus, it is recommended that the sulphide removal processes be sufficient to maintain sulphide contents at and less than 0.1 wt% as S. If sulphide removal processes cannot maintain sulphide contents less than 0.1 wt% as S, mitigation strategies should be evaluated to reduce sulphide oxidation rates (i.e., sub-aqueous deposition, low sulphide cover over tailings or staged deposition with progressive rehabilitation).

GOLDER ASSOCIATES LTD.



Mike Gunsinger, M.Sc.
Environmental Specialist



Che McRae, M.Sc., P.Geo.
Geochemist



Ken DeVos, M.Sc., P.Geo.
Principal, Hydrogeochemist

MRG/CMC/KJD/dh

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TABLES

**SUMMARY OF SAMPLES COLLECTED FOR GEOCHEMICAL TESTING
MARATHON PGM-Cu PROJECT**

ROCK TYPE	NUMBER OF SAMPLES	PERCENTAGE OF TOTAL SAMPLES	ESTIMATED PERCENTAGE OF WASTE ROCK ⁽¹⁾
WASTE ROCK			
Eastern Gabbro	57	50%	44–52%
Two Duck Lake Gabbro	32	28%	27–29%
Volcanic	10	8%	14–18%
Heterolithic Breccia	6	6%	0.3–12%
Syenite	7	6%	0.6–4%
Serpentinite	2	2%	<1%
Total	114	100%	–
TAILINGS			
Combined Tailings – Average Ore Grade ⁽²⁾	1	8%	–
Locked Test Tailings Composite ⁽³⁾	6	50%	–
Floatation Test Tailings Composite ⁽⁴⁾	5	42%	–
Total	12	100%	–

Notes:

(1) Estimated percentage of waste rock for each rock type was visually estimated using the available background information, including geology maps, core logs and cross-sections.

(2) **The combined tailings consist of rougher and cleaner tailings combined as a by-product from the processing of average grade ore.

(3) **Samples from locked testing were combined to formulate composite samples that represent a range of sulphide contents.

(4) **Samples from variability floatation testing were combined to formulate composite samples that represent a range of sulphide contents.

**The tailings samples were generated by SGS Mineral Services from bench-scale, locked and floatation testing and were internally submitted the sample to the environmental department for geochemical testing.

TABLE 2
SUMMARY OF QUALITATIVE X-RAY DIFFRACTION RESULTS: WASTE ROCK
MARATHON PGM-Cu PROJECT

SAMPLE ID	CRYSTALLINE MINERAL ASSEMBLAGE (relative proportions based on peak height)			
	Major	Moderate	Minor	Trace
EASTERN GABBRO				
MAR07-16	plagioclase	quartz	diopside,	*chalcopyrite,
			pyrrhotite	*chalcoalumite, *mica,
				*amphibole
MAR07-18	plagioclase	diopside	ilmenite,	*quartz, *mica,
			magnetite	*calcite, *kaolinite,
				*olivine, *grossular,
				*pyrite, *chlorite,
MAR07-99	plagioclase	diopside	chlorite	*ferropargasite
				*quartz,
				*calcite, *talc,
				*ferropargasite,
TWO DUCK LAKE GABBRO				
MAR07-15	plagioclase	diopside	quartz, magnetite,	*chlorite, *dolomite,
			pyrrhotite,	* mica, *talc,
			amphibole	*chalcopyrite
MAR07-80	plagioclase	diopside		*quartz, *chalcopyrite,
				*mica, *rhodochrosite,
				*chlorite, *zodacite,
				*schachnerite,
MAR07-98	plagioclase	ferropargasite	chlorite	*amphibole, *rutile
				*quartz, *mica
				*talc, *alunite, *calcite,
				*periclase, osbornite,
VOLCANIC				
MAR07-33	plagioclase	amphibole	quartz, diopside	*diopside
				*chlorite, *calcite,
				*chalcopyrite,
				*epidote, *pyrrhotite,
MAR07-96	plagioclase		pyrrhotite,	*potassium-feldspar
			amphibole, mica	*quartz, *chlorite,
HETEROLITHIC BRECCIA				
MAR07-49	plagioclase	diopside		*diopside, *calcite
				*chlorite, *calcite,
				*dolomite, *quartz,
				*amphibole, *talc,
SYENITE				
MAR07-92	plagioclase		potassium-feldspar,	*pyrrhotite,
			quartz	*chalcopyrite
				*diopside, *calcite,
				*mica, *amphibole,

Notes:

Interpretations do not reflect the presence of non-crystalline / amorphous compounds. Mineral proportions are based on relative peak heights and may be strongly influenced by crystallinity, structural group or preferred orientations. Interpretations and relative proportions should be accompanied by supporting petrographic and geochemical data (WRA, ICP-OES).

*Tentative identification due to low concentrations, diffraction line overlap or poor crystallinity.

TABLE 3
STATISTICAL SUMMARY OF WHOLE ROCK RESULTS: WASTE ROCK
MARATHON PGM-Cu PROJECT

PARAMETERS	UNITS	EASTERN GABBRO					TWO DUCK LAKE GABBRO					VOLCANIC				
		MIN	MAX	MED	AVG	STDEV	MIN	MAX	MED	AVG	STDEV	MIN	MAX	MED	AVG	STDEV
SiO ₂	(%)	18	55	46	45	6	29	50	47	46	4	44	64	59	56	7
Al ₂ O ₃	(%)	4	18	14	13	3	6	21	16	15	3	14	16	15	15	1
Fe ₂ O ₃	(%)	8	45	16	18	7	7	35	13	15	6	5	19	9	10	5
MgO	(%)	2	21	8	9	4	4	15	7	7	3	2	6	4	4	1
CaO	(%)	4	15	11	10	2	5	14	11	11	2	5	13	8	8	2
Na ₂ O	(%)	0.4	5	3	2	1	1	4	3	3	1	2	5	3	3	1
K ₂ O	(%)	0.1	2	0.4	1	0.3	0.3	1	1	1	0.2	0.3	2	1	1	1
TiO ₂	(%)	0.2	7	1	1	1	0.3	5	1	1	1	0.3	2	1	1	0.4
P ₂ O ₅	(%)	0.0	7	0.2	1	1	0.1	4	0.3	1	1	0.1	0.4	0.3	0.3	0.1
MnO	(%)	0.1	0.5	0.2	0.3	0.1	0.1	0.4	0.2	0.2	0.1	0.1	0.4	0.2	0.2	0.1
Cr ₂ O ₃	(%)	0.01	0.3	0.04	0.05	0.04	0.01	0.1	0.03	0.03	0.02	0.03	0.1	0.04	0.04	0.01
V ₂ O ₅	(%)	0.01	0.3	0.1	0.1	0.1	0.02	0.2	0.04	0.1	0.04	0.01	0.1	0.02	0.03	0.02
LOI	(%)	-2	3	0.3	0.3	1	-2	5	1	1	1	0.2	3	1	1	1
Sum	(%)	99	102	101	101	1	99	102	100	100	1	99	102	100	100	1
PARAMETERS	UNITS	HETEROLITHIC BRECCIA					SYENITE					SERPENTINITE				
		MIN	MAX	MED	AVG	STDEV	MIN	MAX	MED	AVG	STDEV	MIN	MAX	MED	AVG	STDEV
SiO ₂	(%)	35	49	47	44	5	54	67	60	59	4	54	57	55	55	2
Al ₂ O ₃	(%)	5	17	15	13	4	11	16	14	13	2	14	15	14	14	1
Fe ₂ O ₃	(%)	11	34	12	17	9	5	17	7	9	5	5	10	7	7	3
MgO	(%)	4	17	7	8	4	0.3	2	1	1	1	3	6	4	4	2
CaO	(%)	4	14	12	11	3	2	7	4	5	2	8	9	8	8	1
Na ₂ O	(%)	1	4	2	2	1	3	6	5	5	1	4	5	4	4	1
K ₂ O	(%)	0.2	1	0.4	0.5	0.2	3	5	4	4	1	1	1	1	1	0.1
TiO ₂	(%)	1	2	1	1	0.4	0.3	2	0.4	1	1	1	1	1	1	0.3
P ₂ O ₅	(%)	0.1	1	0.3	0.3	0.2	0.0	1	0.1	0.2	0.2	0.2	0.4	0.3	0.3	0.2
MnO	(%)	0.2	0.5	0.2	0.2	0.1	0.1	0.4	0.2	0.2	0.1	0.1	0.2	0.1	0.1	0.04
Cr ₂ O ₃	(%)	0.02	0.1	0.04	0.04	0.01	0.01	0.04	0.02	0.02	0.01	0.03	0.1	0.04	0.04	0.02
V ₂ O ₅	(%)	0.03	0.1	0.04	0.1	0.04	0.01	0.01	0.01	0.01	0.00	0.02	0.04	0.03	0.03	0.01
LOI	(%)	1	4	1	2	1.2	1	4	2	2	1	3	5	4	4	1
Sum	(%)	98	102	100	100	1	98	101	99	99	1	100	100	100	100	0.1

Notes:

MIN – Minimum; MAX – Maximum; MED – Median; AVG – Average; STDEV – Standard Deviation.

TABLE 4
STATISTICAL SUMMARY OF BULK METAL RESULTS: WASTE ROCK
MARATHON PGM-Cu PROJECT

PARAMETERS	UNITS	TYPICAL CRUSTAL ABUNDANCE ⁽¹⁾	EASTERN GABBRO					TWO DUCK LAKE GABBRO					VOLCANIC					HETEROLITHIC BRECCIA					SYENITE					SERPENTINITE				
			MIN	MAX	MED	AVG	STDEV	MIN	MAX	MED	AVG	STDEV	MIN	MAX	MED	AVG	STDEV	MIN	MAX	MED	AVG	STDEV	MIN	MAX	MED	AVG	STDEV	MIN	MAX	MED	AVG	STDEV
Ag	mg/kg	0.08	0.05	3	0.2	0.3	0.5	0.05	3	0.2	0.5	0.7	0.07	3	0.2	0.5	0.9	0.07	4	1	1	2	0.2	2	1	0.8	0.6	0.2	0.2	0.2	0.2	0.02
Al	mg/kg	82300	18000	95000	70000	66684	15808	30000	110000	78000	74969	17891	69000	80000	76000	74778	3383	26000	85000	72000	66143	20277	52000	78000	70000	67429	9914	68000	72000	70000	70000	2828
As	mg/kg	2	<2	26	1	2	4	<2	3	1	1	0.4	1	4	1	1	1	1	7	1	2	2	<2	<2	1	<2	-	<2	<2	1	<2	-
Ba	mg/kg	425	140	1800	320	352	245	220	2800	390	541	603	200	570	360	347	114	120	380	280	274	106	200	1200	540	610	345	180	270	225	225	64
Be	mg/kg	3	0.2	7	0.4	0.7	1	0.3	2	1	0.7	0.4	0.3	2	1	0.9	0.5	0.3	2	0.5	0.7	0.5	3	11	6	7	3	0.8	1	1	1	0.4
Bi	mg/kg	0.009	0.01	0.5	0.04	0.08	0.1	0.01	0.6	0.04	0.1	0.1	0.01	0.5	0.1	0.1	0.1	0.02	0.4	0.2	0.2	0.2	0.04	0.4	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.02
Ca	mg/kg	41,500	25000	94000	67000	64105	15790	34000	92000	73000	71000	14018	34000	89000	54000	55889	17681	28000	88000	72000	67714	21375	16000	45000	27000	29286	10307	47000	57000	52000	52000	7071
Cd	mg/kg	3	0.07	4	0.2	0.3	0.5	0.002	0.7	0.1	0.3	0.2	0.08	0.9	0.1	0.22	0.3	0.09	0.6	0.4	0.3	0.2	0.1	0.6	0.3	0.3	0.1	0.1	0.1	0.1	0.1	0
Co	mg/kg	25	19	170	66	76	34	27	140	57	61	28	16	56	41	36	15	37	180	65	90	56	4	14	10	9	4	21	43	32	32	16
Cr	mg/kg	102	56	1150	160	241	197	52	460	115	143	90	75	220	160	154	47	100	290	150	166	69	39	130	96	89	34	51	180	116	116	91
Cu	mg/kg	60	29	6300	230	569	1145	43	7300	255	885	1646	33	3300	180	550	1046	79	5700	1300	2038	2087	15	77	42	44	28	85	96	91	91	8
Fe	mg/kg	56,300	50000	290000	110000	121930	48477	49000	240000	85500	98656	47665	34000	94000	60000	61333	22243	71000	230000	78000	116857	63310	32000	110000	54000	62714	30614	35000	63000	49000	49000	19799
K	mg/kg	20,850	1400	14000	4700	5058	2477	3000	12000	5450	5919	1857	3100	16000	7000	9322	5142	2400	8400	4000	4629	1905	27000	37000	28000	30000	3742	9700	9800	9750	9750	71
Li	mg/kg	20	3	19	3	5	4	3	23	3	6	5	3	15	6	6	4	3	13	3	5	4	6	27	11	13	8	3	6	4	4	2
Mg	mg/kg	23300	13000	120000	46000	51684	21647	20000	96000	38000	42781	17123	12000	37000	24000	23778	8772	23000	99000	40000	46143	26561	1800	12000	5600	6800	3959	16000	35000	25500	25500	13435
Mn	mg/kg	950	800	3100	1400	1610	590	800	2800	1200	1373	518	720	2500	1100	1246	560	880	3300	1100	1429	858	490	2900	1300	1527	795	730	1000	865	865	191
Mo	mg/kg	1	0.2	7	1	1	1	0.3	3	1	1	0.6	0.3	3	1	1	1	0.4	5	1	1.6	1.8	2	12	4	6	4	1	2	2	2	0.4
Ni	mg/kg	84	37	1050	160	203	154	4	490	125	150	110	42	220	72	90	56	92	580	300	266	166	5	51	18	19	17	36	200	118	118	116
Pb	mg/kg	14	1	14	3	4	3	1	18	4	4	3	2	11	5	6	3	1	11	8	6	4	12	47	20	22	12	7	7	7	7	-
Sb	mg/kg	0.2	<0.1	4	0.1	0.3	0.7	<0.1	0.3	0.1	0.1	0.08	0.05	1	0.2	0.3	0.4	0.05	1	0.1	0.3	0.4	<0.1	0.5	0.2	0.3	0.2	<0.1	<0.1	0.05	<0.1	-
Se	mg/kg	0.05	<1	6	1	1	0.9	<1	3	1	1	0.7	0.5	2	1	1	1	0.5	4	2	2	1.1	<1	2	1	0.9	0.7	<1	<1	0.5	<1	-
Sn	mg/kg	2	0.2	8	1	1	1	0.4	2	1	0.8	0.3	0.5	2	1	1	1	0.4	6	1	1.6	2.1	1	6	3	3	2	0.9	1	1	1	0.4
Sr	mg/kg	370	200	760	420	441	136	230	1300	585	599	222	250	580	420	414	103	190	610	540	479	146	96	360	180	198	91	240	300	270	270	42
Ti	mg/kg	5650	940	25000	5000	5667	4135	1400	18000	3300	4638	3955	1600	7300	3800	3778	1690	2000	6900	2800	3371	1658	1200	7600	2200	2757	2225	2900	4200	3550	3550	919
Tl	mg/kg	0.9	<0.1	0.3	0.1	0.08	0.06	0.05	0.2	0.1	0.06	0.03	0.05	0.4	0.1	0.10	0.1	0.05	0.1	0.1	0.06	0.02	0.3	0.7	0.4	0.4	0.1	<0.1	<0.1	0.05	<0.1	-
U	mg/kg	3	0.08	8	0	0.8	1	0.3	2	1	0.7	0.4	0.05	2	1	0.81	0.7	0.3	2	0.4	0.7	0.53	5	15	12	11	4	0.7	0.9	1	0.8	0.1
V	mg/kg	120	56	1600	280	346	315	72	780	215	262	165	74	280	140	172	86	130	650	200	299	187	6	74	40	40	23	100	180	140	140	57
Y	mg/kg	33	2	110	12	18	19	8	46	13	16	8	11	29	13	16	6	9	19	12	13	4	23	160	67	76	42	15	18	17	17	2
Zn	mg/kg	70	58	280	110	123	47	51	230	92	101	47	60	210	84	94	45	66	220	92	104	53	28	280	160	157	95	76	100	88	88	17

Notes:
MIN – Minimum; MAX – Maximum; MED – Median; AVG – Average; STDEV – Standard Deviation.
(1) Typical crustal abundance for continental rocks taken from Price (1997).
100 – Concentration greater than typical crustal abundance.
100 – Concentration greater than 5 x the typical crustal abundance.
100 – Concentration greater than 10 x the typical crustal abundance.

STATISTICAL SUMMARY OF ACID-BASE ACCOUNTING (ABA) RESULTS: WASTE ROCK
MARATHON PGM-Cu PROJECT

SAMPLE ID	Paste pH	Solid-phase Chemistry					Acid Potential (t CaCO ₃ /1000 t)	Neutralization Potentials		Net Neutralization Potentials		Net Potential Ratios	
		Total Sulphur (wt% as S)	Sulphide (wt% as S)	Sulphate (wt% as S)	Total Carbon (wt% as C)	Carbonate (wt% as CO ₃)		NP (t CaCO ₃ /1000 t)	CaNP (t CaCO ₃ /1000 t)	NNP (t CaCO ₃ /1000 t)	CaNNP (t CaCO ₃ /1000 t)	NP:AP	CaNP:AP
EASTERN GABBRO (n = 57)													
Min	8.86	0.01	0.01	<0.4	0.01	0.01	0.3	6	0.08	-107	-123	0.15	0.02
Max	10.22	4	4	<0.4	0.4	1	126	120	18	120	17	387	29
Median	9.81	0.03	0.01	<0.4	0.08	0.2	0.3	32	3	30	1	103	8
Average	9.54	0.2	0.1	<0.4	0.1	0.2	4	33	4	29	-0.3	8	1
Std Dev	0.27	0.6	0.6	–	0.08	0.2	17	18	4	27	18	–	–
TWO DUCK LAKE GABBRO (n = 32)													
Min	9.12	0.01	0.01	<0.4	0.01	0.01	0.3	0	0.08	-84	-96	0.24	0.04
Max	10.05	4	4	<0.4	0.5	2	110	64	36	57	36	172	116
Median	9.81	0.05	0.01	<0.4	0.2	0.5	0.5	39	8	36	6	84	16
Average	9.70	0.2	0.2	<0.4	0.2	0.7	5	39	11	34	6	8	2
Std Dev	0.20	0.7	0.6	–	0.2	0.6	19	11	11	24	22	–	–
VOLCANICS (n = 10)													
Min	8.94	0.01	0.01	<0.4	0.05	0.07	0.3	11	1	-277	-300	0.08	0.01
Max	10.08	10	10	<0.4	0.3	1	302	36	17	26	10	74	28
Median	9.51	0.2	0.1	<0.4	0.1	0.2	4	20	4	14	1	5	1
Average	9.33	2	2	<0.4	0.1	0.3	59	23	5	-36	-53	0.4	0.1
Std Dev	0.39	3	3	–	0.09	0.3	105	7	5	104	107	–	–
HETEROLITHIC BRECCIA (n = 6)													
Min	9.52	0.01	0.01	<0.4	0.1	0.2	0.3	17	3	-3	-17	0.84	0.16
Max	10.15	1	0.7	<0.4	0.2	0.9	22	76	15	75	14	244	33
Median	9.72	0.2	0.1	<0.4	0.2	0.5	3	32	8	31	5	10	2
Average	9.70	0.4	0.3	<0.4	0.2	0.5	8	40	8	32	-0.3	5	1
Std Dev	0.23	0.4	0.3	–	0.05	0.2	10	22	4	29	14	–	–
SYENITE (n = 7)													
Min	9.19	0.01	0.01	<0.4	0.2	0.6	0.3	20	13	19	10	12	7
Max	9.60	0.4	0.1	<0.4	0.9	3	5	66	156	61	44	134	88
Median	9.44	0.03	0.01	<0.4	0.4	1	0.3	37	49	36	20	118	159
Average	9.36	0.09	0.04	<0.4	0.5	1	1	37	72	36	22	28	53
Std Dev	0.16	0.1	0.05	–	0.2	0.7	2	15	57	13	11	–	–
SERPENTINITE (n = 2)													
Min	9.86	0.1	0.01	<0.4	0.2	0.6	0.3	48	11	45	8	17	4
Max	9.95	0.2	0.09	<0.4	0.5	2	3	71	29	71	29	230	94
Median	9.90	0.2	0.05	<0.4	0.3	1	2	60	20	58	18	38	13
Average	9.90	0.2	0.05	<0.4	0.3	1	2	60	20	58	18	38	13
Std Dev	0.06	0.08	0.06	–	0.2	0.8	2	16	13	18	15	–	–

TABLE 6
EVALUATION OF THE ACID GENERATION POTENTIALS: WASTE ROCK
MARATHON PGM-Cu PROJECT

SAMPLE ID	SULPHIDE CONTENT (wt% as S)	NET POTENTIAL RATIOS		ACID GENERATION POTENTIAL
		NP:AP	CaNP:AP	
EASTERN GABBRO (n = 57)				
MAR07-01	0.08	13.10	0.27	Non-AG, Low S ²⁻
MAR07-03	0.10	9.04	1.24	Non-AG, Low S ²⁻
MAR07-04	0.03	27.10	6.49	Non-AG, Low S ²⁻
MAR07-05	0.01	46.60	13.88	Non-AG, Low S ²⁻
MAR07-06	0.01	80.60	29.38	Non-AG, Low S ²⁻
MAR07-07	0.01	45.60	7.10	Non-AG, Low S ²⁻
MAR07-08	0.01	139.00	0.27	Non-AG, Low S ²⁻
MAR07-10	0.01	142.00	0.27	Non-AG, Low S ²⁻
MAR07-12	0.01	145.00	0.27	Non-AG, Low S ²⁻
MAR07-16	4.02	0.15	0.02	AG Potential
MAR07-18	0.09	13.50	3.21	Non-AG, Low S ²⁻
MAR07-23	0.06	16.30	1.88	Non-AG, Low S ²⁻
MAR07-24	0.01	68.10	10.81	Non-AG, Low S ²⁻
MAR07-25	0.09	7.69	0.26	Non-AG, Low S ²⁻
MAR07-27	0.54	1.27	0.17	Possible AG Potential
MAR07-32	0.05	26.90	11.47	Non-AG, Low S ²⁻
MAR07-36	0.08	9.50	0.79	Non-AG, Low S ²⁻
MAR07-37	0.01	44.30	21.04	Non-AG, Low S ²⁻
MAR07-38	0.01	110.00	20.50	Non-AG, Low S ²⁻
MAR07-39	0.01	99.00	17.75	Non-AG, Low S ²⁻
MAR07-42	0.02	64.80	6.70	Non-AG, Low S ²⁻
MAR07-43	0.02	48.90	21.52	Non-AG, Low S ²⁻
MAR07-44	0.01	43.20	8.12	Non-AG, Low S ²⁻
MAR07-45	0.02	42.40	14.90	Non-AG, Low S ²⁻
MAR07-46	0.04	27.70	7.19	Non-AG, Low S ²⁻
MAR07-48	0.02	44.80	8.82	Non-AG, Low S ²⁻
MAR07-50	0.02	53.50	0.13	Non-AG, Low S ²⁻
MAR07-51	0.01	88.00	5.38	Non-AG, Low S ²⁻
MAR07-53	0.01	62.10	2.47	Non-AG, Low S ²⁻
MAR07-54	0.01	59.30	4.30	Non-AG, Low S ²⁻
MAR07-55	0.01	66.80	4.41	Non-AG, Low S ²⁻
MAR07-56	0.01	111.00	2.58	Non-AG, Low S ²⁻
MAR07-57	0.01	85.40	2.64	Non-AG, Low S ²⁻
MAR07-58	0.01	115.00	3.17	Non-AG, Low S ²⁻
MAR07-59	0.01	229.00	2.42	Non-AG, Low S ²⁻
MAR07-60	0.01	118.00	3.82	Non-AG, Low S ²⁻
MAR07-61	0.01	110.00	2.85	Non-AG, Low S ²⁻
MAR07-62	0.01	194.00	2.96	Non-AG, Low S ²⁻
MAR07-64	0.12	9.32	1.51	Non-AG, Low S ²⁻
MAR07-65	0.01	387.00	2.74	Non-AG, Low S ²⁻
MAR07-70	0.01	160.00	12.75	Non-AG, Low S ²⁻
MAR07-71	0.01	69.60	11.89	Non-AG, Low S ²⁻
MAR07-72	0.02	51.70	20.47	Non-AG, Low S ²⁻
MAR07-78	0.01	19.40	1.29	Non-AG, Low S ²⁻
MAR07-82	0.03	45.50	5.86	Non-AG, Low S ²⁻
MAR07-83	0.01	127.00	5.60	Non-AG, Low S ²⁻
MAR07-85	0.01	143.00	2.74	Non-AG, Low S ²⁻
MAR07-87	0.01	150.00	3.28	Non-AG, Low S ²⁻
MAR07-89	0.11	11.80	1.04	Non-AG, Low S ²⁻
MAR07-91	0.09	14.70	1.19	Non-AG, Low S ²⁻
MAR07-95	0.01	28.50	6.08	Non-AG, Low S ²⁻
MAR07-97	0.01	211.00	26.74	Non-AG, Low S ²⁻
MAR07-99	0.36	3.50	1.12	Low AG Potential
MAR07-101	1.16	0.43	0.06	AG Potential
MAR07-112	0.01	31.10	4.04	Non-AG, Low S ²⁻
MAR07-113	0.15	9.98	0.51	Non-AG, Low S ²⁻
MAR07-114	0.01	130.00	24.16	Non-AG, Low S ²⁻
TWO DUCK LAKE GABBRO (n = 32)				
MAR07-09	0.01	156.00	2.47	Non-AG, Low S ²⁻
MAR07-11	0.01	68.80	0.27	Non-AG, Low S ²⁻
MAR07-14	0.01	144.00	98.46	Non-AG, Low S ²⁻
MAR07-15	3.52	0.24	0.13	AG Potential
MAR07-19	0.10	18.80	2.24	Non-AG, Low S ²⁻
MAR07-21	0.07	19.40	4.15	Non-AG, Low S ²⁻
MAR07-22	0.02	62.80	18.45	Non-AG, Low S ²⁻
MAR07-28	0.02	72.10	0.73	Non-AG, Low S ²⁻
MAR07-29	0.01	99.50	9.20	Non-AG, Low S ²⁻
MAR07-30	0.01	144.00	25.77	Non-AG, Low S ²⁻
MAR07-31	0.01	138.00	73.71	Non-AG, Low S ²⁻
MAR07-41	0.02	41.50	10.03	Non-AG, Low S ²⁻

TABLE 6
EVALUATION OF THE ACID GENERATION POTENTIALS: WASTE ROCK
MARATHON PGM-Cu PROJECT

SAMPLE ID	SULPHIDE CONTENT (wt% as S)	NET POTENTIAL RATIOS		ACID GENERATION POTENTIAL
		NP:AP	CaNP:AP	
MAR07-47	0.01	132.58	13.50	Non-AG, Low S ²⁻
MAR07-63	0.25	4.91	3.25	Non-AG, Low S ²⁻
MAR07-67	0.02	50.00	11.14	Non-AG, Low S ²⁻
MAR07-68	0.02	44.40	5.68	Non-AG, Low S ²⁻
MAR07-69	0.01	158.00	92.00	Non-AG, Low S ²⁻
MAR07-76	0.12	5.15	0.34	Non-AG, Low S ²⁻
MAR07-77	0.05	21.70	5.64	Non-AG, Low S ²⁻
MAR07-79	0.14	13.60	1.16	Non-AG, Low S ²⁻
MAR07-80	0.19	7.89	0.66	Non-AG, Low S ²⁻
MAR07-84	0.01	110.00	5.49	Non-AG, Low S ²⁻
MAR07-86	0.01	99.60	7.91	Non-AG, Low S ²⁻
MAR07-88	0.01	89.90	12.48	Non-AG, Low S ²⁻
MAR07-90	0.01	90.90	25.39	Non-AG, Low S ²⁻
MAR07-93	0.05	25.20	9.10	Non-AG, Low S ²⁻
MAR07-94	0.01	96.50	53.53	Non-AG, Low S ²⁻
MAR07-98	0.01	164.00	111.91	Non-AG, Low S ²⁻
MAR07-106	0.01	122.00	56.49	Non-AG, Low S ²⁻
MAR07-107	0.55	3.70	0.04	Low AG Potential
MAR07-108	0.05	27.90	15.12	Non-AG, Low S ²⁻
MAR07-109	0.01	172.00	116.21	Non-AG, Low S ²⁻
VOLCANIC (n = 10)				
MAR07-17	0.21	4.98	2.50	Non-AG, Low S ²⁻
MAR07-33	1.63	0.71	0.12	AG Potential
MAR07-34	0.01	36.80	4.68	Non-AG, Low S ²⁻
MAR07-52	0.01	73.90	19.91	Non-AG, Low S ²⁻
MAR07-66	0.82	0.76	0.07	AG Potential
MAR07-96	6.34	0.10	0.01	AG Potential
MAR07-102	0.01	55.60	3.71	Non-AG, Low S ²⁻
MAR07-105	0.01	67.10	27.60	Non-AG, Low S ²⁻
MAR07-111	0.03	21.10	5.39	Non-AG, Low S ²⁻
MAR07-110	9.67	0.08	0.01	AG Potential
HETEROLITHIC BRECCIA (n = 6)				
MAR07-02	0.04	26.20	13.33	Non-AG, Low S ²⁻
MAR07-35	0.01	112.00	24.00	Non-AG, Low S ²⁻
MAR07-49	0.71	1.28	0.22	Possible AG Potential
MAR07-74	0.01	244.00	33.36	Non-AG, Low S ²⁻
MAR07-81	0.18	9.99	1.40	Non-AG, Low S ²⁻
MAR07-100	0.66	0.84	0.16	AG Potential
SYENITE (n = 7)				
MAR07-13	0.09	11.70	6.67	Non-AG, Low S ²⁻
MAR07-20	0.03	40.70	21.82	Non-AG, Low S ²⁻
MAR07-26	0.01	84.70	44.06	Non-AG, Low S ²⁻
MAR07-40	0.01	134.00	87.70	Non-AG, Low S ²⁻
MAR07-73	0.01	118.00	81.78	Non-AG, Low S ²⁻
MAR07-75	0.14	14.60	10.75	Non-AG, Low S ²⁻
MAR07-92	0.01	63.00	34.81	Non-AG, Low S ²⁻
SERPENTINITE (n = 2)				
MAR07-103	0.09	17.20	3.76	Non-AG, Low S ²⁻
MAR07-104	0.01	230.00	94.16	Non-AG, Low S ²⁻

Notes:

(1) Net potential ratios are compared to Price (1997) criteria as follows:

1.00	NP/AP is greater than 4 – potential to generate acidic conditions is "none".
1.00	NP/AP is between 2 and 4 – potential to generate acidic conditions is "low".
1.00	NP/AP is between 1 and 2 – potential to generate acidic conditions is "possible".
1.00	NP/AP is less than 1 – potential to generate acidic conditions is "likely".

(2) Acid generation potentials are based on the sulphide content and NP:AP as follows:

Non-AG, Low S ²⁻	Non-AG, low S ²⁻ : sulphide content less than 0.3 wt% as S and net potential ratio (NP:AP) is greater than 4 (no acid generation potential).
Low AG Potential	Low AG Potential: sulphide content greater than 0.3 wt% as S and net potential ratio (NP:AP) is between 2 and 4.
Possible AG Potential	Possible AG Potential: sulphide content greater than 0.3 wt% as S and net potential ratio (NP:AP) is between 1 and 2.
AG Potential	AG: sulphide content greater than 0.3 wt% as S and net potential ratio (NP:AP) is less than 1.

**NET ACID GENERATION (NAG) TEST RESULTS: WASTE ROCK
MARATHON PGM-Cu PROJECT**

SAMPLE ID	SULPHIDE CONTENT (wt% as S)	NAG pH	NAG ACIDITY ⁽¹⁾ @ pH 4.5 (kg H ₂ SO ₄ / t)	NAG ACIDITY ⁽²⁾ @ pH 7.0 (kg H ₂ SO ₄ / t)	ACID GENERATION POTENTIAL ⁽³⁾
EASTERN GABBRO					
MAR07-16	4.02	2.69	21	50	PAF
MAR07-18	0.09	9.53	0.00	0.00	NAF
MAR07-27	0.54	4.29	0.33	2.6	PAF-LC
MAR07-78	0.01	7.58	0.00	0.00	NAF
MAR07-99	0.36	9.69	0.00	0.00	NAF
MAR07-101	1.16	3.00	11	20	PAF
TWO DUCK LAKE GABBRO					
MAR07-15	3.52	2.87	11	35	PAF
MAR07-41	0.02	9.44	0.00	0.00	NAF
MAR07-63	0.25	9.17	0.00	0.00	NAF
MAR07-80	0.19	7.07	0.00	0.00	NAF
MAR07-98	0.01	10.82	0.00	0.00	NAF
MAR07-107	0.55	4.40	0.32	6.3	PAF-LC
VOLCANIC					
MAR07-33	1.63	3.17	6.1	13	PAF
MAR07-96	6.34	2.53	26	51	PAF
HETEROLITHIC BRECCIA					
MAR07-35	0.01	9.42	0.00	0.00	NAF
MAR07-49	0.71	5.41	0.00	1.9	NAF
SYENITE					
MAR07-75	0.14	8.98	0.00	0.00	NAF
MAR07-92	0.01	9.93	0.00	0.00	NAF

Notes:**4.00**- Denotes NAG pH values less than 4.5 or NAG acidity values greater than 5 kg H₂SO₄/ tonne.

(1) NAG Acidity @ pH 4.5 – measured by a titration to a pH of 4.5.

(2) NAG Acidity @ pH 7.0 – measured by a titration to a pH of 7.0.

(3) Acid generation potential is evaluated according to AMIRA (2002) as follows:

NAF

- Non-acid forming: NAG pH >4.5 and (or) NAG acidity is zero.

PAF-LC- Potentially acid forming - low capacity: NAG pH <4.5 and NAG acidity @ pH 4.5 is less than 5 kg H₂SO₄/ tonne.**PAF**- Potentially acid forming: NAG pH <4.5 and NAG acidity @ pH 4.5 is greater than 5 kg H₂SO₄/ tonne.

TABLE 8
STATISTICAL SUMMARY OF SHORT-TERM LEACH TEST RESULTS: WASTE ROCK
MARATHON PGM-Cu Project

PARAMETER	UNIT	PROVINCIAL WATER QUALITY OBJECTIVES ⁽¹⁻⁸⁾	EASTERN GABBRO					TWO DUCK LAKE GABBRO					VOLCANIC					HETEROLITHIC BRECCIA					SYENITE					SERPENTINITE				
			MIN	MAX	MED	AVG	STDEV	MIN	MAX	MED	AVG	STDEV	MIN	MAX	MED	AVG	STDEV	MIN	MAX	MED	AVG	STDEV	MIN	MAX	MED	AVG	STDEV	MIN	MAX	MED	AVG	STDEV
Al	mg/L	0.015	0.005	1.42	0.2	0.3	0.3316	0.05	0.9	0.2	0.3	0.3	0.08	0.6	0.09	0.2	0.3	0.02	1.0	0.3	0.4	0.5	0.08	0.22	0.15	0.15	0.099	0.98	1.42	1.2	1.2	0.3111
As	mg/L	0.005	0.0001	0.0222	0.0006	0.0018	0.0048	0.0002	0.0038	0.0006	0.001	0.0011	0.0004	0.001	0.0006	0.0007	0.0003	0.0001	0.0039	0.0003	0.0014	0.0021	0.0008	0.002	0.0014	0.0014	0.0008	0.0029	0.0034	0.0032	0.0032	0.0004
Ag	mg/L	0.0001	5E-05	5E-05	5E-05	5E-05	-	5E-05	5E-05	5E-05	5E-05	-	5E-05	5E-05	5E-05	5E-05	-	5E-05	5E-05	5E-05	5E-05	-	5E-05	5E-05	5E-05	5E-05	-	5E-05	5E-05	5E-05	5E-05	-
Ba	mg/L	---	0.2	0.4	0.3	0.3	0.0639	0.2	0.4	0.3	0.3	0.0674	0.2	0.377	0.318	0.284	0.1139	0.0951	0.3	0.2	0.2	0.0907	0.253	0.407	0.33	0.33	0.1089	0.245	0.301	0.273	0.273	0.0396
Be	mg/L	0.011	0.0002	0.0002	0.0002	0.0002	-	0.0002	0.0002	0.0002	0.0002	-	0.0002	0.0002	0.0002	0.0002	-	0.0002	0.0002	0.0002	0.0002	-	0.0002	0.0002	0.0002	0.0002	-	0.0002	0.0002	0.0002	0.0002	-
B	mg/L	0.2	0.016	0.09	0.0465	0.0475	0.0189	0.034	0.073	0.0505	0.05	0.0133	0.042	0.058	0.052	0.0507	0.0081	0.04	0.1	0.075	0.078	0.0396	0.055	0.067	0.061	0.061	0.0085	0.086	0.09	0.088	0.088	0.0028
Bi	mg/L	---	1E-05	0.0005	1E-05	4E-05	0.0001	1E-05	0.0001	1E-05	3E-05	4E-05	1E-05	1E-05	1E-05	1E-05	-	1E-05	1E-05	1E-05	1E-05	-	2E-05	0.0002	0.0001	0.0001	0.0001	1E-05	2E-05	1E-05	1E-05	7E-06
Ca	mg/L	---	1.3	18	4.135	5.759	4.4389	1.53	19.4	4.74	6.002	5.2594	7.04	13.2	7.39	9.21	3.4599	2.5	60.8	8.55	23.95	32.056	5.14	14.4	9.77	9.77	6.5478	1.21	1.24	1.225	1.225	0.0212
Cd	mg/L	0.0001	3E-05	1E-04	3E-05	4E-05	2E-05	3E-05	8E-05	3E-05	4E-05	2E-05	3E-05	3E-05	3E-05	3E-05	-	3E-05	3E-05	3E-05	3E-05	-	3E-05	3E-05	3E-05	3E-05	-	3E-05	3E-05	3E-05	3E-05	-
Co	mg/L	0.0009	5E-05	0.0014	0.0001	0.0003	0.0004	4E-05	0.0006	0.0002	0.0002	0.0002	4E-05	0.0004	5E-05	0.0002	0.0002	0.0002	0.0004	0.0004	0.0003	0.0001	7E-05	8E-05	8E-05	8E-05	6E-06	0.0004	0.0008	0.0006	0.0006	0.0002
Cr	mg/L	0.001	0.0002	0.002	0.0002	0.0003	0.0004	0.0002	0.0012	0.0002	0.0003	0.0003	0.0002	0.0022	0.0002	0.0008	0.0012	0.0002	0.0006	0.0005	0.0004	0.0002	0.0002	0.0002	0.0002	0.0002	0	0.0021	0.0035	0.0028	0.0028	0.001
Cu	mg/L	0.001	0.0004	0.0147	0.0011	0.0025	0.0034	0.0005	0.0259	0.001	0.0057	0.0094	0.0007	0.0057	0.0015	0.0026	0.0027	0.0009	0.0176	0.0019	0.0068	0.0094	0.0004	0.0046	0.0025	0.0025	0.003	0.0007	0.0012	0.001	0.001	0.0004
Fe	mg/L	0.3	0.005	1.56	0.1	0.3	0.4	0.005	0.98	0.2	0.3	0.3	0.01	0.6	0.02	0.2033	0.3	0.005	0.4	0.3	0.235	0.2186	0.01	0.24	0.125	0.125	0.1626	1.07	1.41	1.24	1.24	0.2404
Hg	mg/L	0.0002	5E-05	5E-05	5E-05	5E-05	-	5E-05	5E-05	5E-05	5E-05	-	5E-05	5E-05	5E-05	5E-05	-	5E-05	5E-05	5E-05	5E-05	-	5E-05	5E-05	5E-05	5E-05	-	5E-05	5E-05	5E-05	5E-05	-
K	mg/L	---	0.4	13.8	1.53	3.32	3.813	0.6	15	2.85	4.41	4.1251	0.5	1.7	1.11	1.09	0.6	0.8	1.75	1.65	1.3933	0.5335	0.71	1.9	1.305	1.305	0.8415	0.95	1.08	1.015	1.015	0.0919
Li	mg/L	---	0.001	0.001	0.001	0.001	-	0.001	0.001	0.001	0.001	-	0.001	0.001	0.001	0.001	-	0.001	0.001	0.001	0.001	-	0.001	0.001	0.001	0.001	-	0.001	0.001	0.001	0.001	-
Mg	mg/L	---	0.2	19.6	0.8	2.6588	5.3873	0.4	1.76	1.02	1.0349	0.5	0.2	1.0	0.6	0.6	0.4	0.3	3.16	0.792	1.4137	1.5331	0.893	2.32	1.6065	1.6065	1.009	0.506	0.829	0.6675	0.6675	0.2284
Mn	mg/L	---	0.0005	0.2	0.003	0.0115	0.0332	0.0005	0.013	0.0035	0.0043	0.0034	0.001	0.006	0.005	0.004	0.0026	0.003	0.019	0.004	0.0087	0.009	0.008	0.018	0.013	0.013	0.0071	0.017	0.019	0.018	0.018	0.0014
Mo	mg/L	0.04	0.0012	0.0595	0.004	0.0077	0.0127	0.0024	0.0083	0.0032	0.0037	0.0018	0.003	0.0114	0.0073	0.0072	0.0042	0.0044	0.0358	0.0044	0.0149	0.0181	0.0123	0.0212	0.0167	0.0167	0.0063	0.0085	0.0569	0.0327	0.0327	0.0342
Na	mg/L	---	4.82	20.4	11.4	11.584	5.37	4.55	23.7	10.75	11.77	5.4678	6.18	15.1	11.5	10.927	4.4876	19.3	21.8	19.9	20.333	1.3051	7.36	9.59	8.475	8.475	1.5768	68.2	78.2	73.2	73.2	7.0711
Ni	mg/L	0.025	0.0004	0.0028	0.0006	0.0009	0.0007	0.0004	0.0017	0.0009	0.0009	0.0005	0.0004	0.0017	0.0004	0.0008	0.0008	0.001	0.0113	0.0015	0.0046	0.0058	0.0004	0.0004	0.0004	0.0004	0	0.0012	0.0041	0.0027	0.0027	0.0021
Pb	mg/L	0.001	0.0007	0.0521	0.0019	0.0107	0.015	0.0008	0.0356	0.0013	0.0074	0.0131	0.0012	0.0025	0.0019	0.0019	0.0007	0.0017	0.0242	0.0022	0.0093	0.0129	0.0207	0.0251	0.0229	0.0229	0.0031	0.0019	0.0249	0.0134	0.0134	0.0163
Sb	mg/L	0.02	0.0006	0.0046	0.0009	0.0012	0.0009	0.0006	0.0033	0.0009	0.0011	0.0008	0.0009	0.0018	0.0014	0.0014	0.0005	0.0004	0.0493	0.0009	0.0169	0.0281	0.0011	0.0014	0.0012	0.0012	0.0002	0.0015	0.0015	0.0015	0.0015	-
Se	mg/L	0.1	0.0005	0.006	0.0005	0.0008	0.0012	0.0005	0.001	0.0005	0.0006	0.0002	0.0005	0.0005	0.0005	0.0005	-	0.0005	0.0005	0.0005	0.0005	-	0.0005	0.0005	0.0005	0.0005	-	0.0005	0.0005	0.0005	0.0005	-
Sn	mg/L	---	0.0002	0.0016	0.0006	0.0007	0.0004	0.0002	0.0012	0.0005	0.0006	0.0004	0.0004	0.0089	0.0005	0.0033	0.0049	0.0004	0.0007	0.0007	0.0006	0.0002	0.0007	0.0009	0.0008	0.0008	0.0001	0.0004	0.0005	0.0005	0.0005	7E-05
Sr	Bq/L	---	0.0164	0.1	0.0383	0.0486	0.0299	0.0217	0.2	0.0423	0.0594	0.0522	0.0421	0.1	0.0697	0.0739	0.0341	0.0251	0.4	0.085	0.171	0.2031	0.0413	0.163	0.1022	0.1022	0.0861	0.0135	0.0145	0.014	0.014	0.0007
Ti	mg/L	---	0.0001	0.1	0.002	0.0094	0.0257	0.0002	0.0136	0.0066	0.0059	0.0051	0.0007	0.0256	0.0007	0.009	0.0144	0.0025	0.0144	0.0058	0.0076	0.0061	0.0004	0.0027	0.0016	0.0016	0.0016	0.0496	0.0502	0.0499	0.0499	-
Tl	mg/L	0.0003	5E-05	0.0002	5E-05	6E-05	3E-05	5E-05	5E-05	5E-05	5E-05	7E-21	5E-05	5E-05	5E-05	5E-05	-	5E-05	5E-05	5E-05	5E-05	-	5E-05	5E-05	5E-05	5E-05	-	5E-05	5E-05	5E-05	5E-05	-
U	mg/L	0.005	1E-05	0.0003	1E-05	5E-05	9E-05	1E-05	0.0004	1E-05	6E-05	0.0001	2E-05	9E-05	3E-05	5E-05	4E-05	1E-05	0.0003	9E-05	0.0001	0.0001	0.0005	0.007	0.0038	0.0038	0.0045	0.0002	0.0009	0.0005	0.0005	0.0005
V	mg/L	0.006	3E-05	0.0502	0.0096	0.0114	0.0121	0.0009	0.0287	0.0054	0.0107	0.0099	0.0018	0.0254	0.014	0.0137	0.0118	6E-05	0.0866	0.0122	0.033	0.0469	0.0009	0.0043	0.0026	0.0026	0.0024	0.048	0.118	0.083	0.083	0.0495
W	mg/L	0.03	0.0002	0.0016	0.0005	0.0006	0.0004	0.0002	0.0017	0.0005	0.0006	0.0004	0.0012	0.004	0.0013	0.0022	0.0016	0.0001	0.0079	0.0003	0.0028	0.0044	0.0006	0.0016	0.0011	0.0011	0.0007	0.002	0.0032	0.0026	0.0026	0.0009
Y	mg/L	---	8E-06	0.0003	1E-05	5E-05	9E-05	1E-05	0.0002	2E-05	4E-05	5E-05	7E-06	5E-05	1E-05	3E-05	3E-05	9E-06	0.0001	2E-05	6E-05	8E-05	6E-05	0.0004	0.0002	0.0002	0.0002	0.0001	0.0001	0.0001	0.0001	7E-07
Zn	mg/L	0.02	0.0029	0.0433	0.0066	0.0096	0.0093	0.0026	0.0128	0.0058	0.0064	0.003	0.0048	0.0082	0.0062	0.0064	0.0017	0.0068	0.0659	0.0087	0.0271	0.0336	0.0117	0.0126	0.0121	0.0121	0.0006	0.0139	0.0157	0.0148	0.0148	0.0013

Notes:
0.1 - Denotes a value that is greater than the Provincial Water Quality Objectives (PWQOs). Although it is not practical to directly compare short-term leachate chemistry to PWQOs, comparisons to PWQOs provide insights (at a screening level) regarding parameters for which aqueous geochemistry may be an important consideration. Where parameters have multiple PWQOs, the lowest was applied to be conservative.

(1) MOEE [Ontario Ministry of Environment and Energy], 1994. Policies Guidelines Provincial Water Quality Objectives. Reprinted 1999.

(2) PWQO for P is based on a value to prevent excessive algae growth.

(3) PWQO for Al depends on pH as follows: pH = 4.5-5.5, PWQO = 0.015 mg/L; pH >5.5-6.5, PWQO = 10% of background concentration; pH >6.5-9.0, PWQO = 0.075 mg/L.

(4) PWQO for Be depends on hardness as follows: hardness <75 mg/L as CaCO₃, PWQO = 0.011 mg/L; hardness >75 mg/L as CaCO₃, PWQO = 1.1 mg/L.

(5) PWQO for Cd depends on hardness as follows: hardness 0-100 mg/L as CaCO₃, PWQO = 0.0001 mg/L; hardness >100 mg/L as CaCO₃, PWQO = 0.0005 mg/L.

(6) PWQO for Cr(VI) (0.001 mg/L) was assumed to apply, and thus all the Cr is assumed to occur as Cr(VI).

(7) PWQO for Cu depends on hardness as follows: hardness 0-20 mg/L as CaCO₃, PWQO = 0.001 mg/L; hardness >20 mg/L as CaCO₃, PWQO = 0.005 mg/L.

(8) PWQO for Pb depends on hardness as follows: hardness <30 mg/L as CaCO₃, PWQO = 0.001 mg/L; hardness = 30-80 mg/L as CaCO₃, PWQO = 0.003 mg/L; hardness >80 mg/L as CaCO₃, PWQO = 0.005 mg/L.

TABLE 9
NET ACID GENERATION (NAG) TEST SUPERNATANT CHEMISTRY: WASTE ROCK
MARATHON PGM-Cu PROJECT

PARAMETER	UNITS	PROVINCIAL WATER QUALITY OBJECTIVES ⁽¹⁻⁸⁾	EASTERN GABBRO						TWO DUCK LAKE GABBRO						VOLCANIC		HETEROLITHIC BRECCIA		SYENITE	
			MAR07-18	MAR07-99	MAR07-16	MAR07-27	MAR07-78	MAR07-101	MAR07-98	MAR07-80	MAR07-15	MAR07-41	MAR07-63	MAR07-107	MAR07-33	MAR07-96	MAR07-49	MAR07-35	MAR07-75	MAR07-92
Sulphide Content	wt% as S	---	0.09	0.36	4.02	0.54	0.01	1.16	0.01	0.19	3.52	0.02	0.25	0.55	1.63	6.34	0.71	0.01	0.14	0.01
pH	units	6.5 to 8.5	9.49	9.67	2.55	3.63	7.17	2.89	10.5	3.62	2.71	9.08	8.96	3.12	2.93	2.4	4.78	8.76	3.92	10.1
Alkalinity	mg/L as CaCO ₃	---	40	47	< 2	< 2	17	< 2	79	< 2	< 2	41	37	< 2	< 2	< 2	< 2	39	< 2	76
Acidity	mg/L as CaCO ₃	---	< 2	< 2	534	38	< 2	217	< 2	18	473	< 2	< 2	112	160	862	28	< 2	17	< 2
Conductivity	uS/cm	---	196	331	2170	494	74	1180	227	370	1870	108	400	755	1220	2950	506	148	233	161
SO ₄	mg/L	---	49	100	730	180	6	390	< 5	110	750	6	110	210	420	1100	240	38	75	< 5
Ag	mg/L	0.0001	0.00009	0.00014	0.00006	0.00042	0.00003	0.00091	0.00016	0.00003	0.00038	0.00010	0.00012	0.00023	0.00165	0.00378	0.00020	0.00015	0.00003	0.00001
Al	mg/L	0.015	0.77	1.81	13.7	0.83	0.41	14.1	2.64	0.07	11.9	0.65	2.32	0.87	3.27	20.4	0.08	0.87	0.34	1.45
As	mg/L	0.005	0.0009	0.0029	0.0003	0.0004	0.0013	0.0005	< 0.0002	0.0003	0.0006	< 0.0002	0.0005	0.0004	0.0005	0.0006	0.0004	< 0.0002	0.0003	0.0015
B	mg/L	0.200	0.005	0.011	0.171	0.071	0.004	0.193	0.008	0.020	0.182	0.001	0.006	0.266	0.056	0.260	0.044	0.004	0.002	0.000
Ba	mg/L	---	< 0.00002	< 0.00002	0.0005	0.0001	< 0.00002	0.0020	< 0.00002	< 0.00002	0.0004	< 0.00002	< 0.00002	0.00008	0.0009	0.0014	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Be	mg/L	0.011	0.14	0.20	0.18	0.11	0.04380	0.23	0.15	0.05940	0.07230	0.08600	0.23	0.24	0.06930	0.09640	0.11	0.04180	0.10	0.13
Bi	mg/L	---	< 0.00001	< 0.00001	< 0.00001	< 0.00001	0.00002	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Ca	mg/L	---	28.2	59.9	61.2	34.8	5.3	49.6	31.7	29.0	92.8	15.4	67.5	21.2	105.0	60.0	67.3	22.6	28.1	28.1
Cd	mg/L	0.0001	< 0.000003	< 0.000003	0.00311	0.00187	0.00001	0.00143	0.000011	0.000026	0.00643	< 0.000003	0.000138	0.00327	0.00913	0.00092	0.00272	< 0.000003	0.00003	0.000018
Co	mg/L	0.0009	0.000187	0.000104	0.642	0.218	0.000112	0.514	0.000175	0.000397	0.902	0.000114	0.000564	0.168	0.398	0.999	0.146	0.0001	0.0001	0.000088
Cr	mg/L	0.001	0.0203	0.0250	0.0222	0.0021	0.0190	0.0132	0.0290	0.0146	0.0104	0.0523	0.0191	0.0016	0.0014	0.0289	< 0.0005	0.0408	0.0184	0.0280
Cu	mg/L	0.001	0.0067	0.0017	42.6	9.06	0.0029	6.74	0.0022	0.0893	30.6	0.0038	0.0066	42.0	27.1	11.3	13.7	0.0048	0.0017	0.0008
Fe	mg/L	0.300	0.05	0.03	109	0.24	0.04	21.7	0.09	0.05	119	0.03	0.3	1.76	9.57	228	0.07	0.01	0.08	0.04
Hg	mg/L	0.0002	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
K	mg/L	---	8.58	3.89	6.82	1.64	4.84	8.04	11.30	3.99	3.58	2.58	3.10	6.88	0.65	11.20	1.35	6.20	4.72	3.91
Li	mg/L	---	0.0011	0.0026	0.0217	0.0092	0.0095	0.0412	< 0.0007	0.0041	0.0086	0.0021	0.0013	0.0061	0.0108	0.0553	0.0045	0.0012	0.0022	0.0009
Mg	mg/L	---	0.016	0.01	13.5	14.9	1.55	15.6	0.012	6.95	14	0.05	0.055	16	4.47	17	10.80	0.03	0.06	0.009
Mn	mg/L	---	0.00053	0.00055	1.32	0.698	0.00171	1.13	0.00178	0.0386	1.24	0.00068	0.00691	0.613	2.06	1.2	0.71	0.0005	0.0019	0.00161
Mo	mg/L	0.040	0.00491	0.00203	0.00017	0.00008	0.00796	0.00011	0.01151	0.00154	0.00021	0.00262	0.00478	0.00008	0.00010	0.00032	0.00006	0.00255	0.03872	0.02440
Na	mg/L	---	3.59	3.66	6.2	6.22	2.96	8.9	4.82	3.33	4.58	4.19	4.84	3.89	2.52	7.22	4.20	3.67	4.74	4.30
Ni	mg/L	0.025	0.0002	< 0.0001	2.84	0.696	< 0.0001	1.64	< 0.0001	< 0.0001	3.83	< 0.0001	0.0066	1.24	1.84	2.13	0.855	< 0.0001	< 0.0001	< 0.0001
P	mg/L	0.02	< 0.01	< 0.01	0.11	< 0.01	0.11	0.02	0.02	< 0.01	0.02	0.01	< 0.01	< 0.01	< 0.01	0.11	< 0.01	0.02	0.01	< 0.01
Pb	mg/L	0.0010	0.0001	0.0001	0.0087	0.0002	0.0003	0.0040	0.0008	0.0002	0.0166	0.0002	0.0067	0.0006	0.0041	0.0151	0.0001	0.0001	0.0001	0.0001
Sb	mg/L	0.02	0.00075	0.00067	0.00041	0.00047	0.00099	0.00032	0.00059	0.00052	0.00044	0.00065	0.00041	0.00041	0.00038	0.00035	0.00052	0.00064	0.00078	0.00127
Se	mg/L	0.100	0.007	0.033	0.011	0.007	< 0.001	0.008	< 0.001	0.028	0.016	0.001	0.019	0.026	0.014	0.014	0.019	0.002	0.003	< 0.001
Sn	mg/L	---	0.00016	0.00023	0.00020	0.00020	0.00116	0.00022	0.00025	0.00076	0.00038	0.00020	0.00026	0.00013	0.00017	0.00056	0.00016	0.00017	0.00015	0.00041
Sr	mg/L	---	0.0789	0.1890	0.207	0.244	0.025	0.290	0.140	0.121	0.378	0.080	0.169	0.173	0.182	0.265	0.239	0.110	0.090	0.0498
Ti	mg/L	---	0.0014	0.0006	0.0060	0.0016	0.0152	0.0022	0.0007	0.0013	0.0043	0.0025	0.0009	0.0011	0.0011	0.0069	0.0008	0.0006	0.0009	0.0009
Tl	mg/L	0.0003	< 0.00001	0.00006	0.00033	0.00010	< 0.00001	0.00039	0.00013	0.00003	0.00042	< 0.00001	0.00002	0.00019	0.00063	0.00061	0.00006	< 0.00001	< 0.00001	< 0.00001
U	mg/L	0.005	0.000003	< 0.000001	0.001360	0.001560	0.003220	0.005550	0.000021	0.000034	0.00095	0.000017	0.000679	0.000738	0.003940	0.004490	0.000034	0.000008	0.000355	0.000347
V	mg/L	0.006	0.0392	0.0088	0.00289	0.00005	0.0132	0.00010	0.0130	0.00575	0.00469	0.0259	0.0160	0.00011	0.00009	0.00342	< 0.00003	0.0327	0.0083	0.0111
W	mg/L	0.030	0.0047	0.00224	< 0.00003	0.00014	0.00304	0.00012	0.00131	0.00029	0.00003	0.00187	0.00045	< 0.00003	0.00004	0.00014	0.00005	0.00091	0.00599	0.0042
Y	mg/L	---	0.000010	0.000018	0.02450	0.00255	0.00003	0.08260	0.000126	0.000014	0.01320	0.000032	0.000051	0.00257	0.012100	0.027900	0.00146	0.00000	0.00004	0.000069
Zn	mg/L	0.02	0.001	0.002	0.455	0.362	0.002	0.501	0.006	0.094	0.591	0.002	3.260	0.240	1.700	0.533	0.239	0.002	0.002	0.002

Notes:
0.1 – Denotes a value that is greater than the Provincial Water Quality Objectives (PWQOs). Although it is not practical to directly compare NAG leachate chemistry to PWQOs, comparisons to PWQOs provide insights (at a screening level) regarding parameters for which aqueous geochemistry may be an important consideration. Where parameters have multiple PWQOs, the lowest was applied to be conservative.

- (1) MOEE [Ontario Ministry of Environment and Energy], 1994. Policies Guidelines Provincial Water Quality Objectives. Reprinted 1999.
- (2) PWQO for P is based on a value to prevent excessive algae growth.
- (3) PWQO for Al depends on pH as follows: pH = 4.5 –5.5, PWQO = 0.015 mg/L; pH >5.5–6.5, PWQO = 10% of background concentration; pH >6.5–9.0, PWQO = 0.075 mg/L.
- (4) PWQO for Be depends on hardness as follows: hardness <75 mg/L as CaCO₃, PWQO = 0.011 mg/L; hardness >75 mg/L as CaCO₃, PWQO = 1.1 mg/L.
- (5) PWQO for Cd depends on hardness as follows: hardness 0 –100 mg/L as CaCO₃, PWQO = 0.0001 mg/L; hardness >100 mg/L as CaCO₃, PWQO = 0.0005 mg/L.
- (6) PWQO for Cr(VI) (0.001 mg/L) was assumed to apply, and thus all the Cr is assumed to occur as Cr(VI).
- (7) PWQO for Cu depends on hardness as follows: hardness 0 –20 mg/L as CaCO₃, PWQO = 0.001 mg/L; hardness >20 mg/L as CaCO₃, PWQO = 0.005 mg/L.
- (8) PWQO for Pb depends on hardness as follows: hardness <30 mg/L as CaCO₃, PWQO = 0.001 mg/L; hardness = 30 –80 mg/L as CaCO₃, PWQO = 0.003 mg/L; hardness >80 mg/L as CaCO₃, PWQO = 0.005 mg/L.

TABLE 10
SULPHIDE AND NEUTRALIZATION POTENTIAL DEPLETION RATES
MARATHON PGM-Cu PROJECT

Sample ID	Test Duration (Weeks)	Sulphide Minerals				Initial NP (kg/t as CaCO ₃)	NP (Empirical)			NP (SO ₄ -based)			NP (Ca-based)			NP (Alkalinity-based)		
		Initial (wt% as S)	Remaining (%)	Depletion Rate (mg/kg/wk)	Years to Depletion		Remaining (%)	Depletion Rate (mg/kg/wk)	Years to Depletion	Remaining (%)	Depletion Rate (mg/kg/wk)	Years to Depletion	Remaining (%)	Depletion Rate (mg/kg/wk)	Years to Depletion	Remaining (%)	Depletion Rate (mg/kg/wk)	Years to Depletion
EASTERN GABBRO																		
MAR07-16	56	4.02	99.3	3.6	214	18	95	10	35	95	11	30	95	15	23	99	3	131
MAR07-18	56	0.09	95.8	0.5	33	38	97	14	50	100	2	467	99	11	64	98	14	52
MAR07-99	56	0.36	96.4	2	32	40	98	14	52	99	7	115	99	13	59	99	9	85
TWO DUCK LAKE GABBRO																		
MAR07-15	56	3.52	98.7	6.5	102	26	94	23	20	94	20	23	93	30	15	98	8	58
MAR07-80	56	0.19	95.8	0.6	58	47	99	3	354	99	2	482	99	4	235	99	4	246
MAR07-98	56	0.01	95.0	0.07	26	51	99	6	155	100	0.2	4543	99	4	226	99	7	141
VOLCANICS																		
MAR07-33	56	1.63	98.6	3.2	95	36	97	24	28	98	10	67	97	19	36	99	16	44
MAR07-96	56	6.34	99.5	6.3	193	20	98	20	19	95	19.7	18	91	39	9	98	23	16
HETEROLITHIC BRECCIA																		
MAR07-49	56	0.71	97.5	2.3	58	28	97	12	43	98	7	75	98	12	44	99	6	88
SYENITE																		
MAR07-92	27	0.01	96.9	0.08	25	20	99	6	62	100	0.2	1589	99	6	66	99	7	56
TAILINGS																		
Comb Tailings	36	0.1	81.3	2.91	5	24	93	39	11	98	9.1	50	95	34	13	95	31	14

Notes:

- (1) Depletion calculations were used to determine if the neutralization potential is decreasing at a greater rate as compared to the sulphide content.
- (2) The depletion calculations are based on the results of weeks 51-56 for the waste rock samples and of weeks 29-36 for the tailings sample.
- 1.00 – Time (years) to depletion for the neutralization potential is less than the time to depletion for the sulphide minerals, and thus indicates the samples that are likely to be net acid generating over the long term.

TABLE 11
QUALITATIVE X-RAY DIFFRACTION RESULTS: TAILINGS
MARATHON PGM-Cu PROJECT

SAMPLE ID	CRYSTALLINE MINERAL ASSEMBLAGE (relative proportions based on peak height)			
	Major	Moderate	Minor	Trace
Combined Tailings	plagioclase	diopside	chlorite,	*quartz, *mica, *talc,
(Average Ore Grade)			amphibole	*montmorillonite,
				*magnetite, *ilmenite

Notes:

Interpretations do not reflect the presence of non-crystalline / amorphous compounds. Mineral proportions are based on relative peak heights and may be strongly influenced by crystallinity, structural group or preferred orientations. Interpretations and relative proportions should be accompanied by supporting petrographic and geochemical data (WRA, ICP-OES).

*Tentative identification due to low concentrations, diffraction line overlap or poor crystallinity.

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TABLE 12
WHOLE ROCK RESULTS: TAILINGS
MARATHON PGM-Cu PROJECT

PARAMETERS	UNITS	COMBINED TAILINGS (Average Grade Ore)
SiO ₂	(%)	47
Al ₂ O ₃	(%)	16
Fe ₂ O ₃	(%)	13
MgO	(%)	7
CaO	(%)	13
Na ₂ O	(%)	2
K ₂ O	(%)	0.5
TiO ₂	(%)	1
P ₂ O ₅	(%)	0.3
MnO	(%)	0.2
Cr ₂ O ₃	(%)	0.06
V ₂ O ₅	(%)	0.06
LOI	(%)	1
Sum	(%)	100

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TABLE 13
BULK METAL RESULTS: TAILINGS
MARATHON PGM-Cu PROJECT

PARAMETERS	UNITS	TYPICAL CRUSTAL ABUNDANCE ⁽¹⁾	COMBINED TAILINGS (Average Ore Grade)
Ag	mg/kg	0.08	0.26
Al	mg/kg	82300	76,000
As	mg/kg	2	4.0
Ba	mg/kg	425	300
Be	mg/kg	3	0.32
Bi	mg/kg	0.009	0.8
Ca	mg/kg	41,500	69,000
Cd	mg/kg	3	0.23
Co	mg/kg	25	46
Cr	mg/kg	102	310
Cu	mg/kg	60	62
Fe	mg/kg	56,300	63,000
K	mg/kg	20,850	4,700
Li	mg/kg	20	< 3
Mg	mg/kg	23300	36,000
Mn	mg/kg	950	1,200
Mo	mg/kg	1	13
Ni	mg/kg	84	200
Pb	mg/kg	14	6.1
Sb	mg/kg	0.2	1.4
Se	mg/kg	0.05	1.4
Sn	mg/kg	2	0.90
Sr	mg/kg	370	500
Ti	mg/kg	5650	3,800
Tl	mg/kg	0.9	0.06
U	mg/kg	3	0.44
V	mg/kg	120	280
Y	mg/kg	33	13
Zn	mg/kg	70	100

Notes:

(1) Typical crustal abundance for continental rocks taken from Price (1997).

100	- Concentration greater than typical crustal abundance.
100	- Concentration greater than <u>5 x</u> the typical crustal abundance.
100	- Concentration greater than <u>10 x</u> the typical crustal abundance.

TABLE 14
ACID-BASE ACCOUNTING (ABA) RESULTS: TAILINGS
MARATHON PGM-Cu PROJECT

SAMPLE ID	Paste pH	Solid-phase Chemistry					Acid Potential (t CaCO ₃ /1000 t)	Neutralization Potentials		Net Neutralization Potentials		Net Potential Ratios ⁽²⁾		ACID GENERATION POTENTIAL ⁽³⁾
		Total Sulphur (wt% as S)	Sulphide (wt% as S)	Sulphate (wt% as S)	Total Carbon (wt% as C)	Carbonate (wt% as CO ₃)		NP (t CaCO ₃ /1000 t)	CaNP ⁽¹⁾ (t CaCO ₃ /1000 t)	NNP (t CaCO ₃ /1000 t)	CaNNP ⁽¹⁾ (t CaCO ₃ /1000 t)	NP:AP	CaNP:AP	
COMBINED TAILINGS														
MAR07-Tailings	8.82	0.18	0.10	<0.4	0.11	0.32	3.1	24.0	5.3	20.9	2.2	7.7	1.7	Non-AG, Low S ²⁻
LOCKED TEST TAILINGS COMPOSITES														
LCT1	8.76	0.20	0.14	0.05	0.11	0.37	4.4	23.0	6.2	18.6	1.8	5.2	1.4	Non-AG, Low S ²⁻
LCT2	8.50	0.09	0.10	< 0.01	0.06	0.17	3.1	21.5	2.8	18.4	-0.3	6.9	0.9	Non-AG, Low S ²⁻
LCT3	8.42	0.26	0.23	0.03	0.07	0.19	7.2	21.4	3.1	14.2	-4.1	3.0	0.4	Non-AG, Low S ²⁻
LCT4	8.51	0.45	0.25	0.20	0.11	0.38	7.8	27.2	6.3	19.4	-1.5	3.5	0.8	Non-AG, Low S ²⁻
LCT5	8.26	0.51	0.44	0.06	0.10	0.38	13.8	25.1	6.4	11.3	-7.4	1.8	0.5	Possible AG
LCT6	8.46	1.04	0.82	0.22	0.12	0.38	25.6	28.2	6.3	2.6	-19.3	1.1	0.2	Possible AG
VARIABILITY FLOATATION TEST TAILINGS COMPOSITES														
F087	8.77	0.35	0.18	0.17	0.07	0.26	5.6	21.5	4.3	15.9	-1.3	3.8	0.8	Non-AG, Low S ²⁻
F088	8.64	0.30	0.20	0.11	0.07	0.21	6.2	21.6	3.5	15.4	-2.7	3.5	0.6	Non-AG, Low S ²⁻
F089	8.61	0.56	0.31	0.25	0.08	0.22	9.7	21.6	3.7	11.9	-6.0	2.2	0.4	Low AG
F090	8.49	0.31	0.16	0.14	0.08	0.30	5.0	20.0	5.0	15.0	0.0	4.0	1.0	Non-AG, Low S ²⁻
F091	8.75	0.22	0.07	0.15	0.13	0.48	2.2	24.8	8.0	22.6	5.8	11.3	3.6	Non-AG, Low S ²⁻

Notes:
(1) CaNP is derived from concentration of carbonate as wt% CO₃. The CaNP is used to determine the carbonate net neutralization potential (CaNNP) from wt%CO₃ and the carbonate net potential ratio (CaNP/AP).

(2) Net potential ratios are compared to Price (1997) criteria as follows:

1.00	- NP/AP is greater than 4 – potential to generate acidic conditions is "none".
1.00	- NP/AP is between 2 and 4 – potential to generate acidic conditions is "low".
1.00	- NP/AP is between 1 and 2 – potential to generate acidic conditions is "possible".
1.00	- NP/AP is less than 1 – potential to generate acidic conditions is "likely".

(3) Acid generation potentials are based on the sulphide content and NP:AP as as follows:

Non-AG, Low S ²⁻	- Non-AG, low S ²⁻ : sulphide content less than 0.3 wt% as S and net potential ratio (NP:AP) is greater than 4 (no acid generation potential).
Low AG	- Low AG Potential: sulphide content greater than 0.3 wt% as S and net potential ratio (NP:AP) is between 2 and 4.
Possible AG	- Possible AG Potential: sulphide content greater than 0.3 wt% as S and net potential ratio (NP:AP) is between 1 and 2.
AG	- AG: sulphide content greater than 0.3 wt% as S and net potential ratio (NP:AP) is less than 1.

TABLE 15
NET ACID GENERATION (NAG) TEST RESULTS: TAILINGS
MARATHON PGM-Cu PROJECT

SAMPLE ID	SULPHIDE CONTENT (wt% as S)	NAG pH	NAG ACIDITY ⁽¹⁾ @ pH 4.5 (kg H ₂ SO ₄ / t)	NAG ACIDITY ⁽²⁾ @ pH 7.0 (kg H ₂ SO ₄ / t)	ACID GENERATION POTENTIAL ⁽³⁾
COMBINED TAILINGS					
MAR07-Tailings	0.10	7.77	0.00	0.00	NAF
LOCKED TEST TAILINGS COMPOSITES					
LCT1	0.14	8.31	0.00	0.00	NAF
LCT2	0.10	5.94	0.00	0.97	NAF
LCT3	0.23	4.23	0.33	2.6	PAF-LC
LCT4	0.25	4.19	0.32	2.9	PAF-LC
LCT5	0.44	4.61	0.00	2.2	NAF
LCT6	0.82	3.98	0.65	3.3	PAF-LC
VARIABILITY FLOATATION TEST TAILINGS COMPOSITES					
F087	0.18	4.67	0.00	1.6	NAF
F088	0.20	5.60	0.00	0.33	NAF
F089	0.31	3.53	2.6	4.8	PAF-LC
F090	0.16	9.34	0.00	0.00	NAF
F091	0.07	9.33	0.00	0.00	NAF

Notes:

1.00 – Denotes NAG pH values less than 4.5 or NAG acidity values greater than 5 kg H₂SO₄/ tonne.

(1) NAG Acidity @ pH 4.5 – measured by a titration to a pH of 4.5.

(2) NAG Acidity @ pH 7.0 – measured by a titration to a pH of 7.0.

(3) Acid generation potential is evaluated according to AMIRA (2002) as follows:

NAF	– Non-acid forming: NAG pH >4.5 and (or) NAG acidity is zero.
PAF-LC	– Potentially acid forming - low capacity: NAG pH <4.5 and NAG acidity @ pH 4.5 is less than 5 kg H ₂ SO ₄ / tonne.
PAF	– Potentially acid forming: NAG pH <4.5 and NAG acidity @ pH 4.5 is greater than 5 kg H ₂ SO ₄ / tonne.

TABLE 16
TAILINGS DECANT WATER QUALITY RESULTS
MARATHON PGM-Cu PROJECT

PARAMETER	UNITS	PROVINCIAL WATER QUALITY GUIDELINES ⁽¹⁻⁸⁾	COMBINED TAILINGS (Average Ore Grade)	
			Total	Dissolved
pH		6.5 to 8.5	8.9	-
Conductivity	uS/cm	---	368	-
Alkalinity	mg/L as CaCO ₃	---	152	-
Acidity	mg/L as CaCO ₃	---	< 2	-
SO ₄	mg/L	---	51	-
Cl	mg/L	---	28	-
Hg	mg/L	0.0002	0.0001	< 0.0001
Al	mg/L	0.015	175	0.3
As	mg/L	0.005	0.005	0.001
Ag	mg/L	0.0001	0.0003	< 0.00001
Ba	mg/L	---	0.6	0.01
Be	mg/L	0.011	0.001	< 0.00002
B	mg/L	0.2	0.1	0.1
Bi	mg/L	---	0.0005	< 0.00001
Ca	mg/L	---	94	8.7
Cd	mg/L	0.0001	0.001	< 0.000003
Co	mg/L	0.0009	0.1	0.0002
Cr	mg/L	0.001	0.3	0.001
Cu	mg/L	0.001	0.9	0.0005
Fe	mg/L	0.3	299	0.6
K	mg/L	---	16	10.6
Li	mg/L	---	0.03	< 0.002
Mg	mg/L	---	147	1.8
Mn	mg/L	---	2.8	0.02
Mo	mg/L	0.04	0.05	0.06
Na	mg/L	---	86	69
Ni	mg/L	0.025	0.5	0.003
P	mg/L	0.02	0.9	1.0
Pb	mg/L	0.001	0.2	0.0001
Sb	mg/L	0.02	< 0.003	0.003
Se	mg/L	0.1	0.002	< 0.001
Si	mg/L	---	146	3.8
Sn	mg/L	---	0.004	0.003
Sr	Bq/L	---	1	0.1
Ti	mg/L	---	2.2	0.002
Tl	mg/L	0.0003	0.0003	0.000004
U	mg/L	0.005	0.001	0.0001
V	mg/L	0.006	0.3	0.002
Zn	mg/L	0.02	1	0.03

Notes:**0.1**

– Denotes a value that is greater than the Provincial Water Quality Objectives (PWQOs). Although it is not practical to directly compare tailings decant chemistry to PWQOs, comparisons to PWQOs provide insights (at a screening level) regarding parameters for which aqueous geochemistry may be an important consideration. Where parameters have multiple PWQOs, the lowest was applied to be conservative.

(1) MOEE [Ontario Ministry of Environment and Energy], 1994. Policies Guidelines Provincial Water Quality Objectives. Reprinted 1999.

(2) PWQO for P is based on a value to prevent excessive algae growth.

(3) PWQO for Al depends on pH as follows: pH = 4.5–5.5, PWQO = 0.015 mg/L; pH >5.5–6.5, PWQO = 10% of background concentration; pH >6.5–9.0, PWQO = 0.075 mg/L.

(4) PWQO for Be depends on hardness as follows: hardness <75 mg/L as CaCO₃, PWQO = 0.011 mg/L; hardness >75 mg/L as CaCO₃, PWQO = 1.1

(5) PWQO for Cd depends on hardness as follows: hardness 0–100 mg/L as CaCO₃, PWQO = 0.0001 mg/L; hardness >100 mg/L as CaCO₃, PWQO =

(6) PWQO for Cr(VI) (0.001 mg/L) was assumed to apply, and thus all the Cr is assumed to occur as Cr(VI).

(7) PWQO for Cu depends on hardness as follows: hardness 0–20 mg/L as CaCO₃, PWQO = 0.001 mg/L; hardness >20 mg/L as CaCO₃, PWQO = 0.005

(8) PWQO for Pb depends on hardness as follows: hardness <30 mg/L as CaCO₃, PWQO = 0.001 mg/L; hardness = 30–80 mg/L as CaCO₃, PWQO = 0.003 mg/L; hardness >80 mg/L as CaCO₃, PWQO = 0.005 mg/L.

TABLE 17
STATISTICAL SUMMARY OF SHORT-TERM LEACH TEST RESULTS: TAILINGS
MARATHON PGM-Cu PROJECT

PARAMETER	UNIT	PROVINCIAL WATER QUALITY OBJECTIVES ⁽¹⁻⁸⁾	COMBINED TAILINGS (Average Ore Grade)
Al	mg/L	0.015	6.9
As	mg/L	0.005	0.002
Ag	mg/L	0.0001	0.0002
Ba	mg/L	---	0.6
Be	mg/L	0.011	0.00003
B	mg/L	0.2	0.7
Bi	mg/L	---	0.0001
Ca	mg/L	---	10.8
Cd	mg/L	0.0001	0.0001
Co	mg/L	0.0009	0.006
Cr	mg/L	0.001	0.025
Cu	mg/L	0.001	0.1
Fe	mg/L	0.3	12
Hg	mg/L	0.0002	0.00005
K	mg/L	---	1.8
Li	mg/L	---	0.001
Mg	mg/L	---	4.9
Mn	mg/L	---	0.1
Mo	mg/L	0.04	0.04
Na	mg/L	---	26
Ni	mg/L	0.025	0.02
Pb	mg/L	0.001	0.008
Sb	mg/L	0.02	0.0008
Se	mg/L	0.1	0.0005
Sn	mg/L	---	0.0004
Sr	Bq/L	---	0.1
Ti	mg/L	---	0.1
Tl	mg/L	0.0003	0.00001
U	mg/L	0.005	0.0001
V	mg/L	0.006	0.01
W	mg/L	0.03	0.002
Y	mg/L	---	0.0007
Zn	mg/L	0.02	0.2

Notes:**0.1**

– Denotes a value that is greater than the Provincial Water Quality Objectives (PWQOs). Although it is not practical to directly compare short-term leachate chemistry to PWQOs, comparisons to PWQOs provide insights (at a screening level) regarding parameters for which aqueous geochemistry may be an important consideration. Where parameters have multiple PWQOs, the lowest was applied to be conservative.

(1) MOEE [Ontario Ministry of Environment and Energy], 1994. Policies Guidelines Provincial Water Quality Objectives. Reprinted 11

(2) PWQO for P is based on a value to prevent excessive algae growth.

(3) PWQO for Al depends on pH as follows: pH = 4.5–5.5, PWQO = 0.015 mg/L; pH >5.5–6.5, PWQO = 10% of background concentration; pH >6.5–9.0, PWQO = 0.075 mg/L.

(4) PWQO for Be depends on hardness as follows: hardness <75 mg/L as CaCO₃, PWQO = 0.011 mg/L; hardness >75 mg/L as CaCO₃, PWQO = 1.1 mg/L.

(5) PWQO for Cd depends on hardness as follows: hardness 0–100 mg/L as CaCO₃, PWQO = 0.0001 mg/L; hardness >100 mg/L as CaCO₃, PWQO = 0.0005 mg/L.

(6) PWQO for Cr(VI) (0.001 mg/L) was assumed to apply, and thus all the Cr is assumed to occur as Cr(VI).

(7) PWQO for Cu depends on hardness as follows: hardness 0–20 mg/L as CaCO₃, PWQO = 0.001 mg/L; hardness >20 mg/L as CaCO₃, PWQO = 0.005 mg/L.

(8) PWQO for Pb depends on hardness as follows: hardness <30 mg/L as CaCO₃, PWQO = 0.001 mg/L; hardness = 30–80 mg/L as CaCO₃, PWQO = 0.003 mg/L; hardness >80 mg/L as CaCO₃, PWQO = 0.005 mg/L.

TABLE 18
NET ACID GENERATION (NAG) TEST SUPERNATANT CHEMISTRY: TAILINGS
MARATHON PGM-Cu PROJECT

PARAMETER	UNITS	PROVINCIAL WATER QUALITY OBJECTIVES ⁽¹⁻⁸⁾	LOCKED TEST TAILINGS COMPOSITES						VARIABILITY FLOATATION TAILINGS COMPOSITES					COMBINED TAILINGS (Average Ore Grade)
			LCT1	LCT2	LCT3	LCT4	LCT5	LCT6	F087	F088	F089	F090	F091	
Sulphide Content	wt% as S	---	0.14	0.10	0.23	0.25	0.44	0.82	0.18	0.20	0.31	0.16	0.07	0.10
pH	units	6.5 to 8.5	6.99	5.24	3.86	4.83	6.24	4.18	4.58	5.54	3.59	6.55	9.38	6.67
Alkalinity	mg/L as CaCO3	---	25	< 2	< 2	< 2	3	< 2	< 2	< 2	< 2	5	45	7
Acidity	mg/L as CaCO3	---	< 2	4	16	5	3	13	8	3	39	< 2	< 2	< 2
Conductivity	uS/cm	---	170	190	330	320	270	430	260	200	440	190	150	179
SO4	mg/L	---	46	69	120	140	110	180	110	85	160	72	29	57
Ag	mg/L	0.0001	< 0.00001	0.00004	0.00005	< 0.00001	< 0.00001	0.00003	0.00006	0.00004	0.00004	< 0.00001	< 0.00001	0.00008
Al	mg/L	0.015	0.53	< 0.01	0.34	0.02	< 0.01	0.48	0.23	0.01	1.54	0.02	1.12	0.29
As	mg/L	0.005	0.0010	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	0.0007	0.0002
B	mg/L	0.200	0.193	0.088	0.146	0.121	0.054	0.222	0.070	0.126	0.057	0.111	0.243	0.008
Ba	mg/L	---	0.0057	0.0296	0.0894	0.0723	0.0320	0.148	0.0710	0.0308	0.113	0.0145	0.0042	< 0.00002
Be	mg/L	0.011	< 0.00002	0.00003	0.00008	< 0.00002	< 0.00002	0.00008	0.00004	< 0.00002	0.00025	< 0.00002	< 0.00002	0.09590
Bi	mg/L	---	0.00002	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	0.00002	< 0.00001	< 0.00001	< 0.00001
Ca	mg/L	---	26.9	20.5	28.3	41.6	37.8	51.9	29.1	24.4	30.2	26.2	25.1	26.9
Cd	mg/L	0.0001	0.000007	0.000099	0.00123	0.00073	0.000028	0.00321	0.00105	0.00035	0.00202	0.000009	0.000004	0.000007
Co	mg/L	0.0009	0.000155	0.017	0.188	0.102	0.00307	0.316	0.151	0.061	0.227	0.000409	0.000129	0.000129
Cr	mg/L	0.001	0.053	0.032	0.026	0.032	0.0127	0.017	0.027	0.022	0.0023	0.033	0.049	0.076
Cu	mg/L	0.001	0.0047	0.0127	1.2200	0.0668	0.0037	1.6400	1.0000	0.0595	2.4300	0.0037	0.0007	0.0035
Fe	mg/L	0.300	0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	2.38	< 0.01	< 0.01	< 0.01
Hg	mg/L	0.0002	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
K	mg/L	---	3.10	3.76	3.65	4.66	4.05	5.44	3.51	2.85	4.93	4.96	4.12	2.69
Li	mg/L	---	0.0041	0.0059	0.0074	0.0090	0.0090	0.0108	0.0076	0.0056	0.0072	0.0050	0.0023	0.0024
Mg	mg/L	---	0.031	4.42	7.57	5.43	4.04	8.53	5.37	4.53	7.43	1.54	0.013	0.103
Mn	mg/L	---	0.00058	0.111	0.504	0.287	0.0206	0.721	0.455	0.257	0.80	0.00408	0.00017	0.00050
Mo	mg/L	0.040	0.00587	0.00079	0.00023	0.00023	0.00484	0.00020	0.00018	0.00017	0.00010	0.00453	0.00405	0.00692
Na	mg/L	---	1.34	0.91	1.55	1.59	1.41	2.52	1.22	1.06	1.69	1.01	1.49	1.45
Ni	mg/L	0.025	0.0004	0.0906	0.984	0.451	0.0107	1.31	0.695	0.296	1.07	0.0016	< 0.0001	< 0.0001
P	mg/L	0.02	< 0.01	< 0.01	0.02	0.01	< 0.01	0.03	0.02	< 0.01	0.02	0.04	0.03	< 0.01
Pb	mg/L	0.001	0.00004	0.00002	0.00029	0.00006	0.00004	0.00136	0.00027	0.00002	0.00487	0.00002	0.00004	0.00013
Sb	mg/L	0.02	0.00126	0.00079	0.00076	0.00063	0.00104	0.00054	0.00043	0.00049	0.00199	0.00068	0.00112	0.00055
Se	mg/L	0.100	0.002	0.006	0.008	0.007	0.005	0.010	0.006	0.007	0.009	0.006	0.002	0.003
Sn	mg/L	---	0.00049	0.00009	0.00021	0.00014	0.00018	0.00015	< 0.00001	< 0.00001	0.00045	< 0.00001	0.00009	0.00035
Sr	mg/L	---	0.0774	0.0997	0.155	0.153	0.126	0.222	0.134	0.124	0.162	0.104	0.0890	0.0832
Ti	mg/L	---	0.0007	0.0004	0.0011	0.0006	0.0005	0.0010	0.0006	0.0004	0.0008	0.0004	0.0006	0.0003
Tl	mg/L	0.0003	< 0.00001	0.00006	0.00016	0.00014	0.00007	0.00031	0.00015	0.00009	0.00026	0.00004	0.00001	0.00001
U	mg/L	0.005	0.000017	0.000002	0.000155	0.000004	< 0.000001	0.000312	0.000137	0.000001	0.001060	0.000005	0.000003	0.000010
V	mg/L	0.006	0.0171	0.00065	0.00126	0.00010	< 0.00003	0.00007	0.00142	0.00015	< 0.00003	< 0.00003	0.0110	0.0078
W	mg/L	0.030	0.0135	0.00044	0.00012	0.00004	0.00017	< 0.00003	< 0.00003	< 0.00003	< 0.00003	0.00330	0.0117	0.0045
Y	mg/L	---	0.000006	0.000007	0.00130	0.000058	0.000002	0.00127	0.000793	0.000015	0.00425	0.000002	0.000001	0.000013
Zn	mg/L	0.02	0.001	0.020	0.440	0.155	0.005	0.823	0.240	0.043	0.421	0.001	< 0.001	0.004

Notes:

- 0.1
- Denotes a value that is greater than the Provincial Water Quality Objectives (PWQOs). Although it is not practical to directly compare short-term leachate chemistry to PWQOs, comparisons to PWQOs provide insights (at a screening level) regarding parameters for which aqueous geochemistry may be an important consideration. Where parameters have multiple PWQOs, the lowest was applied to be conservative.

(1) MOEE [Ontario Ministry of Environment and Energy], 1994. Policies Guidelines Provincial Water Quality Objectives. Reprinted 1999.

(2) PWQO for P is based on a value to prevent excessive algae growth.

(3) PWQO for Al depends on pH as follows: pH = 4.5–5.5, PWQO = 0.015 mg/L; pH >5.5–6.5, PWQO = 10% of background concentration; pH >6.5–9.0, PWQO = 0.075 mg/L.

(4) PWQO for Be depends on hardness as follows: hardness <75 mg/L as CaCQ, PWQO = 0.011 mg/L; hardness >75 mg/L as CaCO₃, PWQO = 1.1 mg/L.

(5) PWQO for Cd depends on hardness as follows: hardness 0–100 mg/L as CaCO₃, PWQO = 0.0001 mg/L; hardness >100 mg/L as CaCO₃, PWQO = 0.0005 mg/L.

(6) PWQO for Cr(VI) (0.001 mg/L) was assumed to apply, and thus all the Cr is assumed to occur as Cr(VI).

(7) PWQO for Cu depends on hardness as follows: hardness 0–20 mg/L as CaCO₃, PWQO = 0.001 mg/L; hardness >20 mg/L as CaCO₃, PWQO = 0.005 mg/L.

(8) PWQO for Pb depends on hardness as follows: hardness <30 mg/L as CaCQ, PWQO = 0.001 mg/L; hardness = 30–80 mg/L as CaCO₃, PWQO = 0.003 mg/L; hardness >80 mg/L as CaCO₃, PWQO = 0.005 mg/L.

PARAMETER	UNITS	TAILINGS WATER QUALITY ⁽¹⁾	NEUTRAL ROCK DRAINAGE (NRD) WATER QUALITIES – KINETIC TEST RESULTS ⁽²⁾					ACID ROCK DRAINAGE (ARD) WATER QUALITIES – NAG TEST RESULTS ⁽³⁾							
			Eastern Gabbro	Two Duck Lake Gabbro	Volcanics	Heterolithic Breccia	Syenite	Eastern Gabbro	Eastern Gabbro	Eastern Gabbro	Two Duck Lake Gabbro	Two Duck Lake Gabbro	Volcanics	Volcanics	AVERAGE ARD WATER QUALITY
Humidity Cell Sample ID		MAR07-TAIL	MAR07-16 MAR07-18 MAR07-99	MAR07-15 MAR07-80 MAR07-98	MAR07-33 MAR07-96	MAR07-49	MAR07-92	MAR07-16	MAR07-27	MAR07-101	MAR07-15	MAR07-107	MAR07-33	MAR07-96	
Proportion ⁽⁴⁾		49.0%	23.0%	13.0%	7.60%	2.80%	0.90%	–	–	–	–	–	–	–	3.70%
pH	–	7.58	7.02	7.11	7.01	7.11	7.27	2.55	3.63	2.89	2.71	3.12	2.93	2.40	2.76
Alkalinity	mg/L as CaCO ₃	41.0	9.61	8.17	7.08	8.00	8.00	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Sulphate (SO4)	mg/L	12.1	8.7	11.7	14.0	10.7	0.3	730	180	390	750	210	420	1100	540
Calcium (Ca)	mg/L	16.7	6.0	6.9	10.5	7.2	2.2	61.2	34.8	49.6	92.8	21.2	105.0	60.0	61
Iron (Fe)	mg/L	0.005	0.005	0.005	0.005	0.005	0.005	109	0.24	21.7	119	1.76	9.57	228	70
Aluminum (Al)	mg/L	0.10	0.06	0.02	0.01	0.02	0.04	13.7	0.83	14.1	11.9	0.87	3.27	20.4	9.3
Arsenic (As)	mg/L	0.0003	0.0023	0.0013	0.0002	0.0001	0.0001	0.0003	0.0004	0.0005	0.0006	0.0004	0.0005	0.0006	0.00047
Barium (Ba)	mg/L	0.0029	0.0034	0.0019	0.0024	0.0003	0.0003	0.0005	0.0001	0.0020	0.0004	0.00008	0.0009	0.0014	0.00075
Beryllium (Be)	mg/L	0.0000100	0.00001	0.00001	0.00001	0.00001	0.00001	0.18	0.11	0.23	0.07230	0.24	0.06930	0.09640	0.14
Boron (B)	mg/L	0.0022	0.0012	0.0008	0.0010	0.0013	0.0004	0.171	0.071	0.193	0.182	0.266	0.056	0.260	0.17
Cadmium (Cd)	mg/L	0.000008	0.000005	0.000004	0.000003	0.000004	0.000002	0.00311	0.00187	0.00143	0.00643	0.00327	0.00913	0.00092	0.0037
Cobalt (Co)	mg/L	0.0001	0.0001	0.0001	0.0001	0.0000	0.0000	0.642	0.218	0.514	0.902	0.168	0.398	0.999	0.55
Chromium (Cr)	mg/L	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.0222	0.0021	0.0132	0.0104	0.0016	0.0014	0.0289	0.011
Copper (Cu)	mg/L	0.0003	0.0018	0.0022	0.0031	0.0020	0.0003	42.6	9.06	6.74	30.6	42.0	27.1	11.3	24
Potassium (K)	mg/L	2.59	1.66	1.08	0.72	0.11	0.19	6.82	1.64	8.04	3.58	6.88	0.65	11.20	5.5
Magnesium (Mg)	mg/L	1.51	0.33	0.47	0.27	0.38	0.37	13.5	14.9	15.6	14	16	4.47	17	14
Manganese (Mn)	mg/L	0.012	0.012	0.013	0.017	0.004	0.010	1.32	0.698	1.13	1.24	0.613	2.06	1.2	1.2
Molybdenum (Mo)	mg/L	0.00739	0.00034	0.00028	0.00017	0.00009	0.00104	0.00017	0.00008	0.00011	0.00021	0.00008	0.00010	0.00032	0.00015
Nickel (Ni)	mg/L	0.0005	0.0004	0.0004	0.0003	0.0002	0.0001	2.84	0.696	1.64	3.83	1.24	1.84	2.13	2.0
Lead (Pb)	mg/L	0.00006	0.00005	0.00001	0.00002	0.00001	0.00009	0.0087	0.0002	0.0040	0.0166	0.0006	0.0041	0.0151	0.0070
Selenium (Se)	mg/L	0.00050	0.0005	0.0005	0.0005	0.0005	0.0005	0.011	0.007	0.008	0.016	0.026	0.014	0.014	0.014
Strontium (Sr)	mg/L	0.092	0.039	0.040	0.041	0.055	0.015	0.207	0.244	0.290	0.378	0.173	0.182	0.265	0.25
Vanadium (V)	mg/L	0.00137	0.00055	0.00043	0.00016	0.00025	0.00045	0.00289	0.00005	0.00010	0.00469	0.00011	0.00009	0.00342	0.0016
Zinc (Zn)	mg/L	0.0018	0.0008	0.0018	0.0021	0.0005	0.0005	0.455	0.362	0.501	0.591	0.240	1.700	0.533	0.63

Notes:

(1) Tailings water quality is calculated from humidity cell test results weeks 15–20.

(2) Neutral drainage waste rock water qualities are calculated from humidity cell testing weeks 35–40. An average water quality was calculated for rock types with more than one humidity cell.

(3) Acid rock drainage waste rock water qualities were derived from the NAG supernatant chemistries for samples that are expected to be acid generating. These water qualities were used to calculate an average ARD water quality to be mixed with the NRD and tailings water qualities.

(4) Proportions at which the tailings, NRD waste rock and ARD waste rock water qualities were mixed in PHREEQC. Based on the site water balance, the proportion of tailings runoff flow rates versus waste rock runoff flow rates are constant for all months (49% of total mine waste runoff is from tailings and 51% of the total mine waste runoff is from waste rock, based on annual flow rates of 116,036 m³/mon for the tailings runoff and 119,872 m³/mon for the waste rock runoff). It is further assumed that the waste rock drainage will consist of 93% NRD and 7% ARD. Thus, the overall drainage from the mine waste management area consists of 49% tailings drainage, 47.3% NRD and 3.70% ARD.

TABLE 20
WATER QUALITY MODELING RESULTS:
ESTIMATED COMBINED TAILINGS AND WASTE ROCK EFFLUENT WATER QUALITY
MARATHON PGM-Cu PROJECT

PARAMETER	UNITS	PROVINCIAL WATER QUALITY OBJECTIVES ⁽¹⁻⁸⁾	ESTIMATED COMBINED TAILINGS & WASTE ROCK EFFLUENT WATER QUALITY ⁽⁹⁾		INPUT WATER QUALITY						
			MIX	EQUILIBRATED MIX	TAILINGS EFFLUENT WATER QUALITY ⁽¹⁰⁾	Neutral Rock Drainage from Waste Rock ⁽¹¹⁾					Acid Rock Drainage from Waste Rock ⁽¹²⁾
						Eastern Gabbro	Two Duck Lake Gabbro	Volcanics	Heterolithic Breccia	Syenite	
pH	-	6.5-8.5	3.69	7.88	7.58	7.02	7.11	7.01	7.11	7.27	2.76
Alkalinity	mg/L as CaCO ₃	-	24	20	41	9.6	8.2	7.1	8.0	8.0	< 2
Aluminum	mg/L	0.075	0.41	0.0087	0.10	0.055	0.022	0.011	0.020	0.035	9.3
Arsenic	mg/L	0.005	0.00086	0.00086	0.00030	0.0022	0.0013	0.00018	0.00010	0.00010	0.00047
Boron	mg/L	0.2	0.0079	0.0078	0.0022	0.0012	0.00083	0.0010	0.0013	0.000400039	0.17
Barium	mg/L	-	0.0027	0.0026	0.0029	0.0034	0.0019	0.0024	0.00034	0.00029	0.00075
Beryllium	mg/L	0.011	0.0053	0.0053	0.000010	0.000010	0.000010	0.000010	0.000010	0.000010	0.14
Calcium	mg/L	-	14	14	17	6.0	6.9	11	7.2	2.2	61
Cadmium	mg/L	0.0001	0.00014	0.00014	0.0000077	0.0000045	0.0000041	0.0000034	0.0000040	0.0000015	0.0037
Cobalt	mg/L	0.0009	0.020	0.020	0.00012	0.00011	0.00015	0.00010	0.000032	0.000013	0.55
Chromium	mg/L	0.001	0.00066	0.00017	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.011
Copper	mg/L	0.001	0.90	0.89	0.00025	0.0018	0.0022	0.0031	0.0020	0.00025	24
Iron	mg/L	0.3	2.6	1.7	0.0050	0.0050	0.0053	0.0050	0.0050	0.0050	70
Potassium	mg/L	-	2.1	2.0	2.6	1.7	1.1	0.71	0.10	0.19	5.5
Magnesium	mg/L	-	1.4	1.4	1.5	0.33	0.47	0.27	0.38	0.37	14
Manganese	mg/L	-	0.056	0.055	0.012	0.012	0.013	0.017	0.0041	0.0097	1.2
Molybdenum	mg/L	0.04	0.0038	0.0037	0.0074	0.00034	0.00028	0.00017	0.000090	0.0010	0.00015
Nickel	mg/L	0.025	0.076	0.075	0.00045	0.00038	0.00044	0.00029	0.00018	0.000050	2.0
Lead	mg/L	0.001	0.00030	0.00030	0.000055	0.000050	0.000010	0.000017	0.000010	0.000090	0.0070
Selenium	mg/L	0.1	0.00099	0.00098	0.00050	0.00050	0.00050	0.00050	0.00050	0.00050	0.014
Sulphate	mg/L	-	31	31	12	8.7	12	14	11	0.25	540
Strontium	mg/L	-	0.073	0.073	0.092	0.039	0.040	0.041	0.055	0.015	0.25
Vanadium	mg/L	0.006	0.00093	0.00093	0.0014	0.00055	0.00043	0.00016	0.00025	0.00045	0.0016
Zinc	mg/L	0.02	0.025	0.024	0.0018	0.00075	0.0018	0.0021	0.00050	0.00050	0.63

Notes:

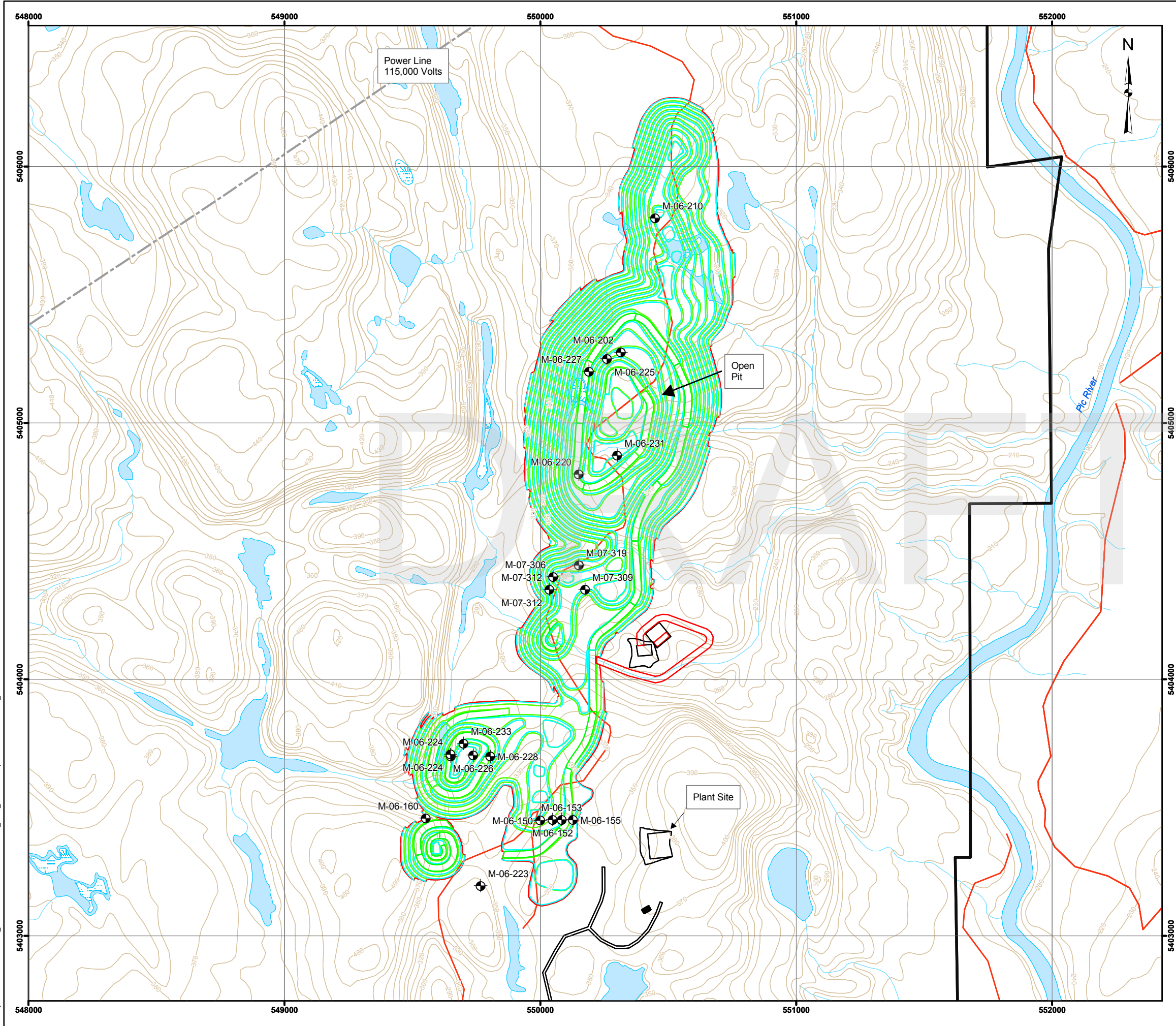
0.1 - Denotes a value that is greater than the Provincial Water Quality Objectives (PWQOs). Although it is not practical to directly compare the mixed tailings and waste rock effluent chemistry to PWQOs, comparisons to PWQOs provide insights (at a screening level) regarding parameters for which aqueous geochemistry may be an important consideration. Where parameters have multiple PWQOs, the lowest was applied to be conservative.

- (1) MOEE [Ontario Ministry of Environment and Energy], 1994. Policies Guidelines Provincial Water Quality Objectives. Reprinted 1999.
- (2) PWQO for P is based on a value to prevent excessive algae growth.
- (3) PWQO for Al depends on pH as follows: pH = 4.5-5.5, PWQO = 0.015 mg/L; pH >5.5-6.5, PWQO = 10% of background concentration; pH >6.5-9.0, PWQO = 0.075 mg/L.
- (4) PWQO for Be depends on hardness as follows: hardness <75 mg/L as CaCO₃, PWQO = 0.011 mg/L; hardness >75 mg/L as CaCO₃, PWQO = 1.1 mg/L.
- (5) PWQO for Cd depends on hardness as follows: hardness 0-100 mg/L as CaCO₃, PWQO = 0.0001 mg/L; hardness >100 mg/L as CaCO₃, PWQO = 0.0005 mg/L.
- (6) PWQO for Cr(VI) (0.001 mg/L) was assumed to apply, and thus all the Cr is assumed to occur as Cr(VI).
- (7) PWQO for Cu depends on hardness as follows: hardness 0-20 mg/L as CaCO₃, PWQO = 0.001 mg/L; hardness >20 mg/L as CaCO₃, PWQO = 0.005 mg/L.
- (8) PWQO for Pb depends on hardness as follows: hardness <30 mg/L as CaCO₃, PWQO = 0.001 mg/L; hardness = 30-80 mg/L as CaCO₃, PWQO = 0.003 mg/L; hardness >80 mg/L as CaCO₃, PWQO = 0.005 mg/L.
- (9) Water quality modeling results: estimated combined tailings and waste rock effluent water quality was determined using the geochemical speciation model PHREEQC. Two water qualities are presented: 1) a "Mix" that is simply a mix of all the input water qualities, and 2) an "Equilibrated Mix" that is also a mix of all the input water qualities, but also considers the solubility's of various secondary minerals. The precipitation of various secondary minerals (i.e., ferric oxyhydroxides) may reduce concentrations in solution; however, the "Equilibrated Mix" assumes that the concentrations are dissolved and not total concentrations.
- (10) Tailings water quality is calculated from humidity cell testing weeks 15-20.
- (11) Neutral rock drainage waste rock water qualities are calculated from humidity cell testing weeks 35-40. An average water quality was calculated for rock types with more than one humidity cell.
- (12) Acid rock drainage waste rock water qualities are calculated from the NAG supernatant chemistries (Table 19).

DRAFT

FIGURES

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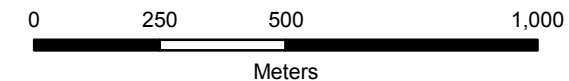
LEGEND

- Drill Hole
- Roads
- Hydro Line
- Rivers
- Site Design
- Gravel Road
- Pit Toe
- Pit Ramp
- Pit Crest
- Water Area, Permanent
- Wetland, Permanent
- Property Boundary



REFERENCE

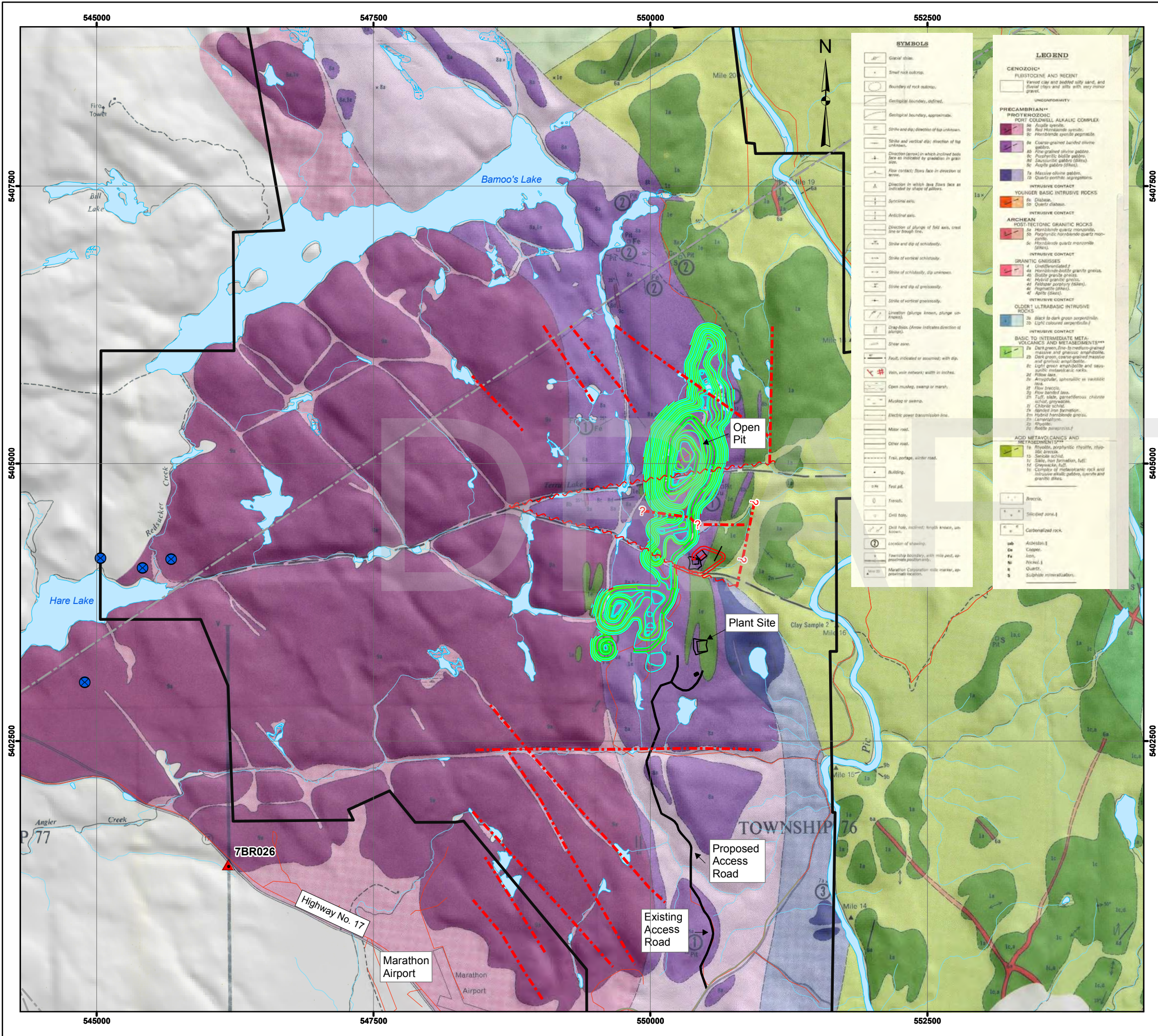
Base Data - MNR NRVIS, obtained 2004, CANMAP v2005.4
Produced by Golder Associates Ltd under licence from
Ontario Ministry of Natural Resources, © Queens Printer 2006
Site Layout - Provided by P&E Mining Consultants, Oct 2006
Datum: NAD 27 Projection: UTM Zone 16N



OWNER			
PROJECT	MARATHON PGM PROJECT		
TITLE	GEOCHEMISTRY DRILL HOLE PLAN		
	PROJECT No. 07-1118-0012		SCALE 1:15,000
	DESIGN	SC	21 Feb. 2007
	GIS	SC	14 Nov. 2008
	CHECK	JW	14 Nov. 2008
	REVIEW	MG	14 Nov. 2008

FIGURE: 1

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LEGEND

- Aggregate Testing Location
 - Potential Quarry Sites
 - Site Design
 - Gravel Road
 - Pit Toe
 - Pit Ramp
 - Pit Crest
 - Roads
 - Hydro Line
 - Rivers
 - Water Area, Permanent
 - Wetland, Permanent
 - Property Boundary
- Structural Interpretation**
- Inferred Fault (See Note 1)
 - Topographical Lineament (Selected)
 - Denotes Uncertainty

NOTES

1. Inferred faults based on topographical lineaments and Ontario GSC Mapping 1:250000, 2003

REFERENCE

Base Data - MNR NRVIS, obtained 2004, CANMAP v2005.4
Produced by Golder Associates Ltd under licence from Ontario Ministry of Natural Resources, © Queens Printer 2008
Site Layout - Provided by P&E Mining Consultants, Feb 2008
Geology Map - Bamboos Lake Map sheet, M2099, Ontario Department of Mines, 1966
Quarry Sites - Technical Report – Physical Work, "Block Extraction / Stripping / Sampling", McCoy Township, Augite Syenite Property (Thunder Bay Mining Division), Report 42D16SW0042. Zozipovic, A. for the Ontario Ministry of Northern Development and Mines, 1997
Datum: NAD 27 Projection: UTM Zone 16N



OWNER			
PROJECT	MARATHON PGM PROJECT		
TITLE	REGIONAL GEOLOGY (BAMOOS LAKE SHEET) GEOLOGY (M2099)		
	PROJECT No.	07-1118-0012	SCALE 1:35,000
	DESIGN	SC 21 Feb. 2007	Ver. 1.0
	GIS	SC 13 Nov. 2008	
	CHECK	JW 13 Nov. 2008	
	REVIEW	MG 13 Nov. 2008	

FIGURE: 2

FIGURE 3
SULPHIDE CONTENT vs. PASTE pH: WASTE ROCK
MARATHON PGM-Cu PROJECT

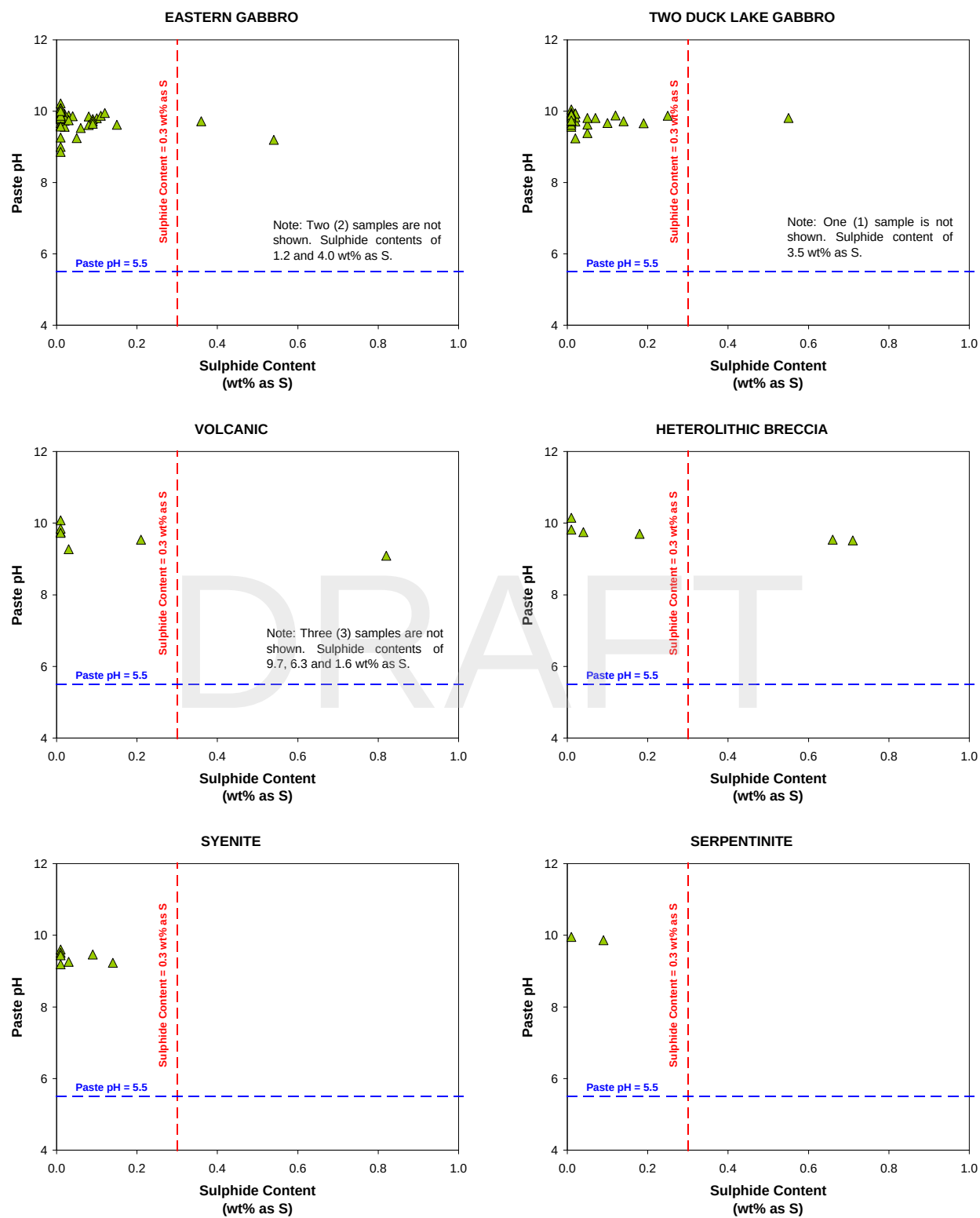
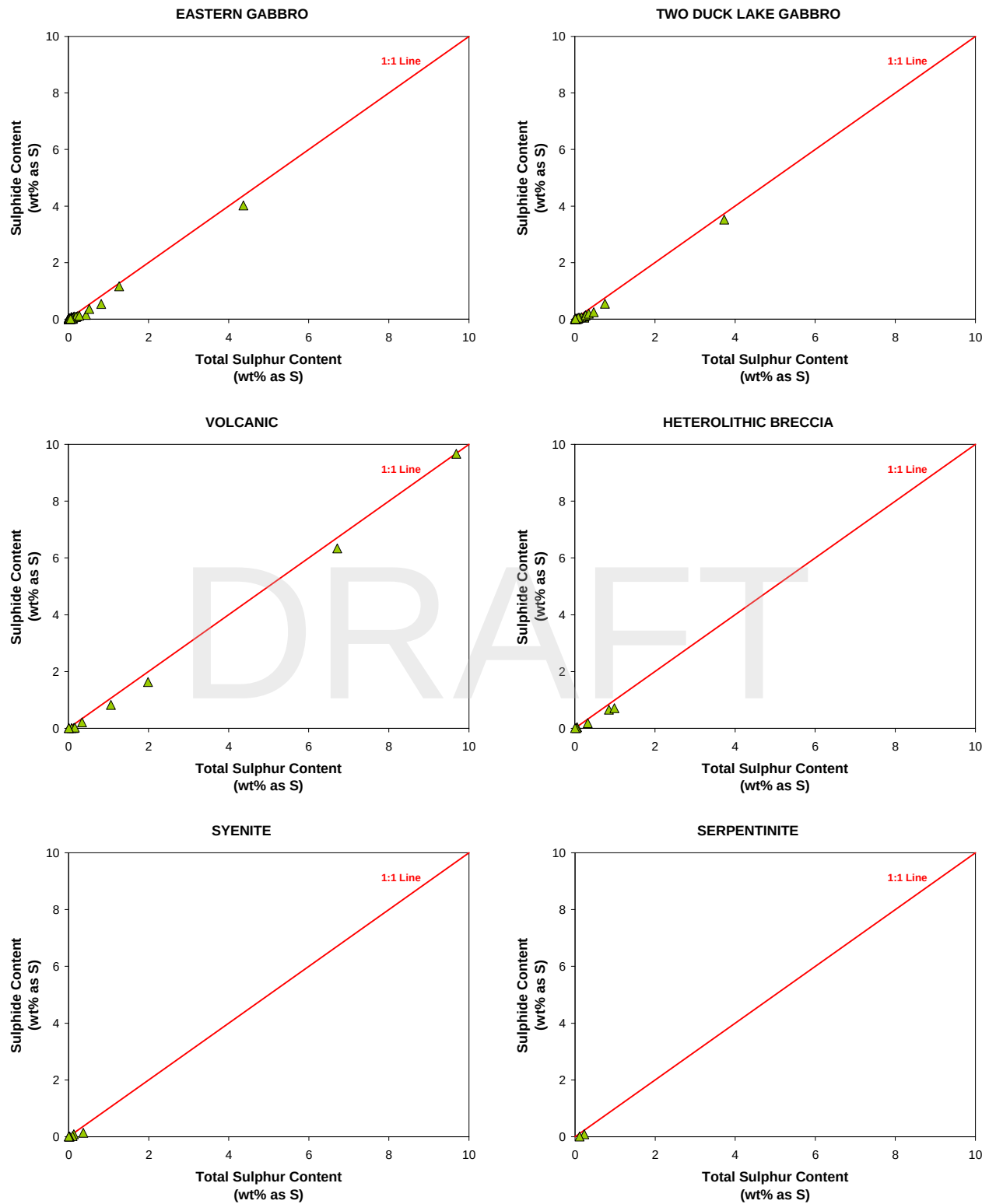


FIGURE 4
TOTAL SULPHUR CONTENT vs. SULPHIDE CONTENT: WASTE ROCK
MARATHON PGM-Cu PROJECT



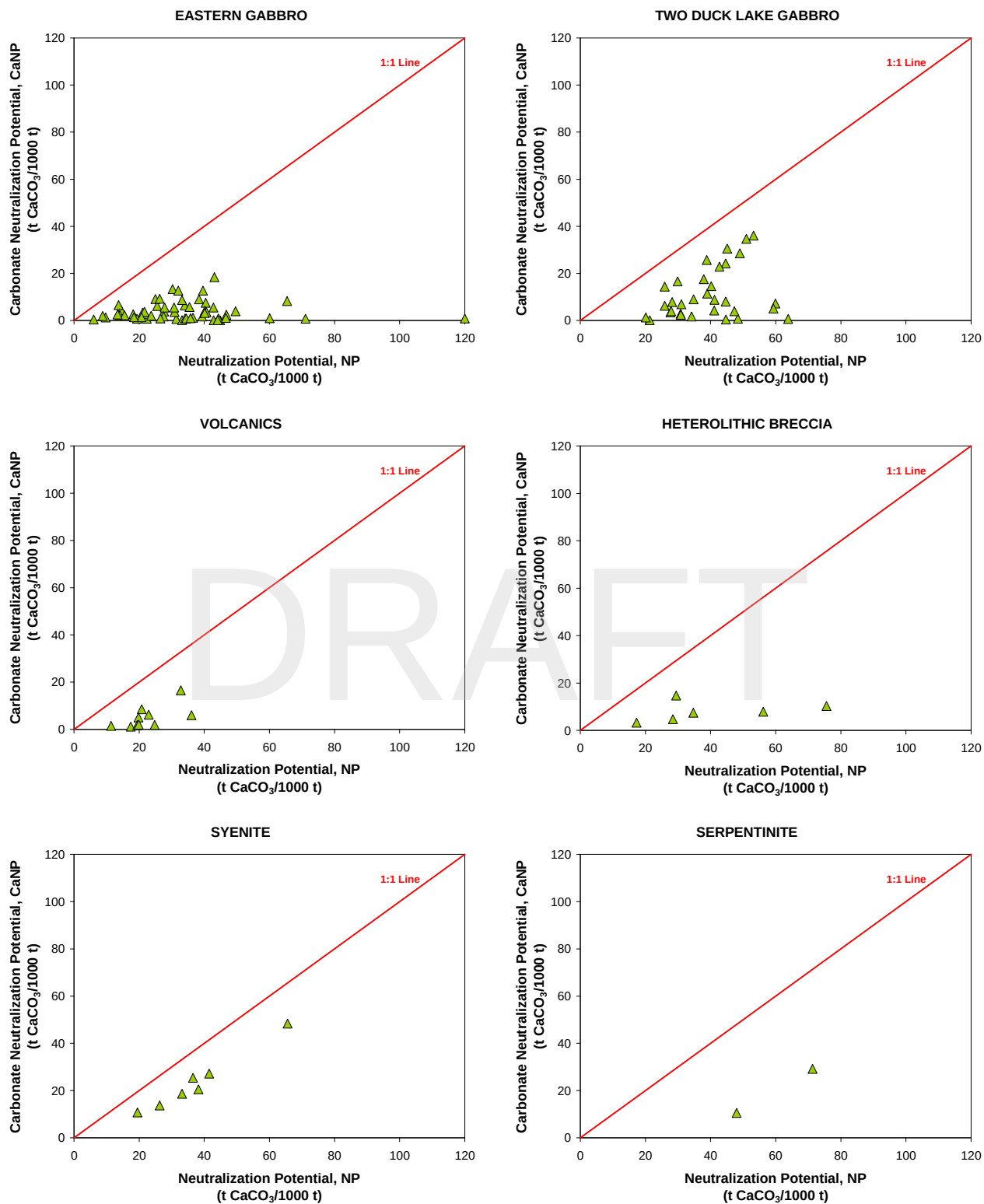
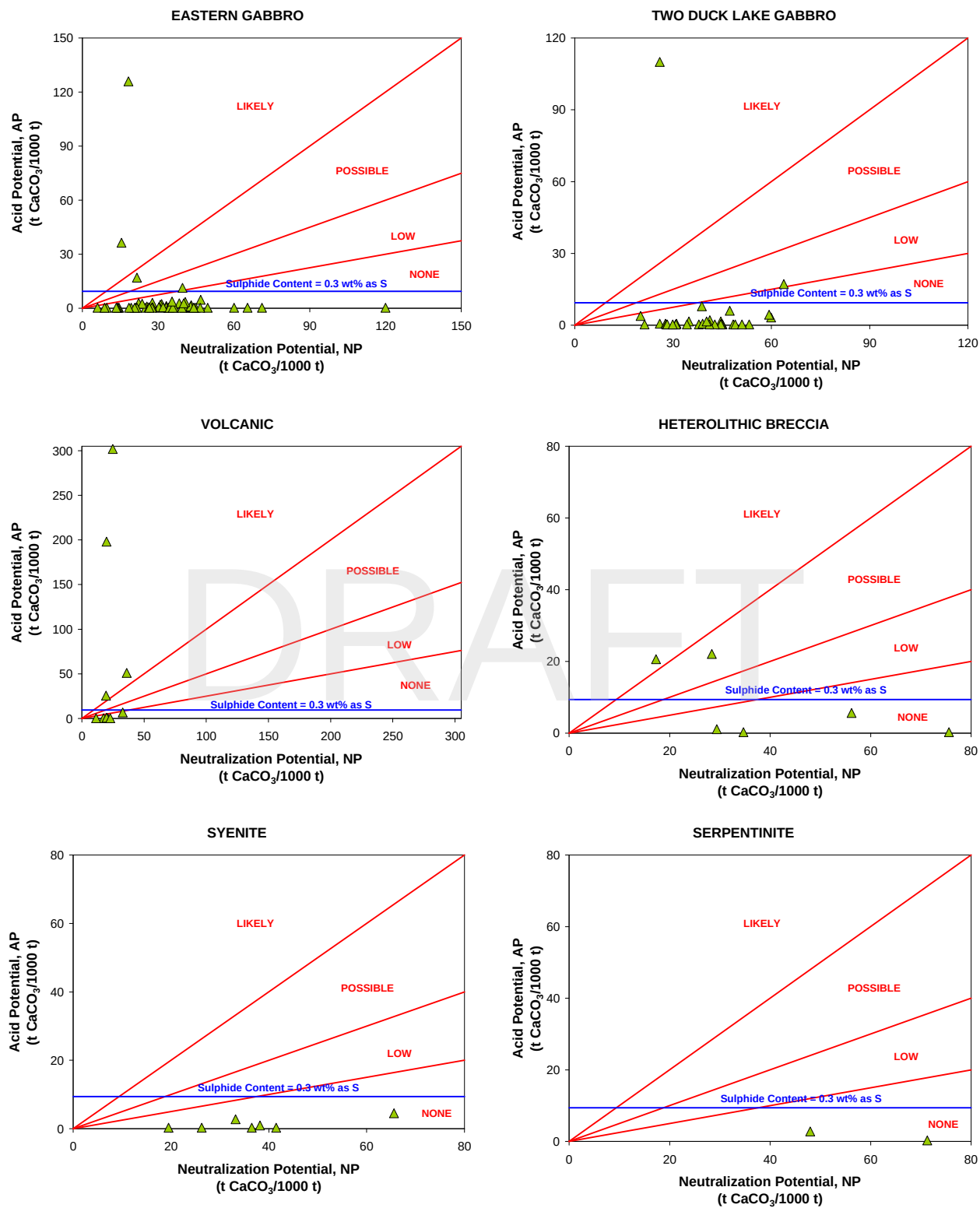
**NEUTRALIZATION POTENTIAL (NP) vs. CARBONATE NEUTRALIZATION POTENTIAL (CaNP): WASTE ROCK
MARATHON PGM-Cu PROJECT**

FIGURE 6
NEUTRALIZATION POTENTIAL (NP) vs. ACID POTENTIAL (AP): WASTE ROCK
MARATHON PGM-Cu PROJECT



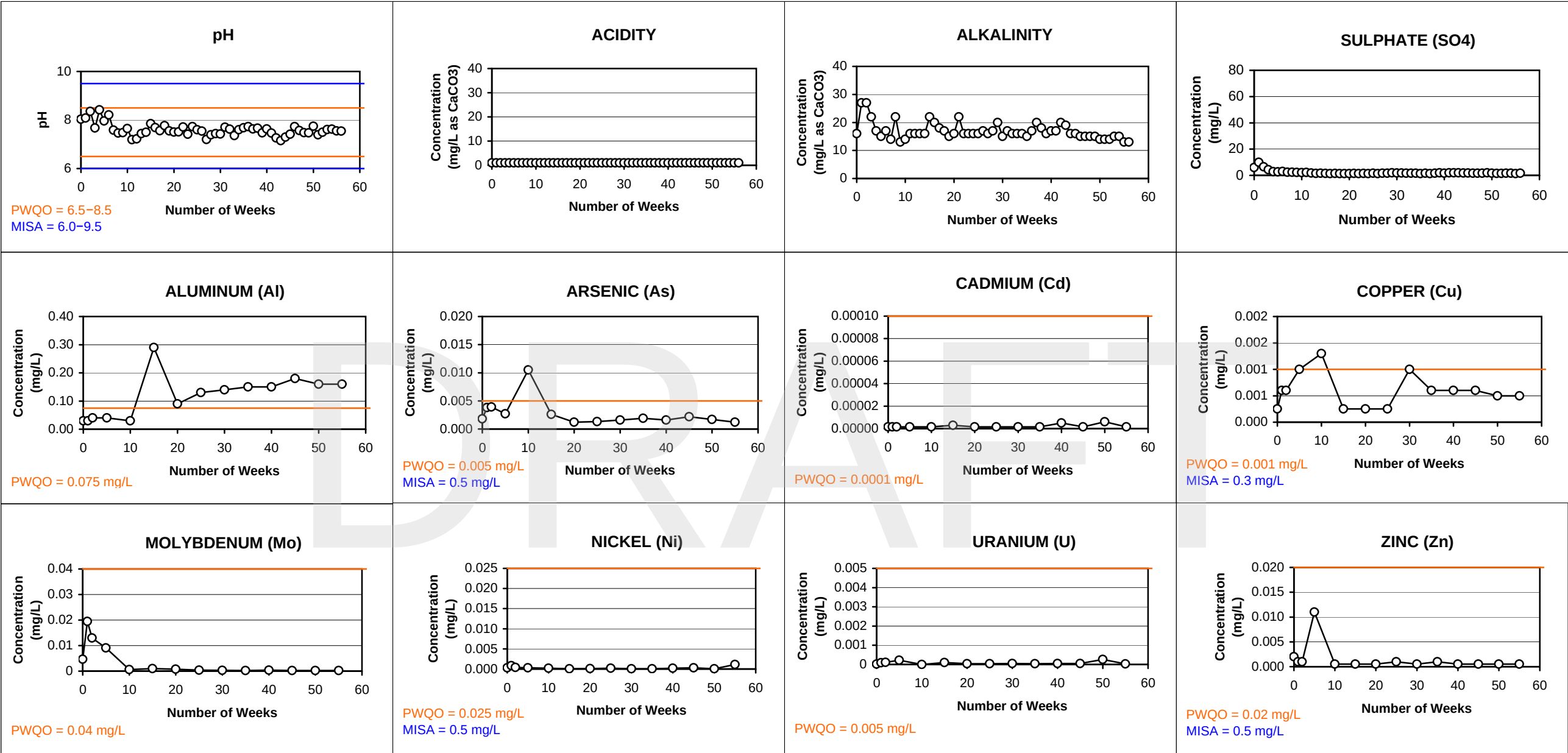
Note: The sulphide content of 0.3 wt% as S is equivalent to an AP value of 9.4. The value of 0.3 wt% as S is a basic guideline to serve as a starting point in interpreting the acid generating properties.

The figure consists of six subplots arranged in a 3x2 grid, each showing the relationship between Acid Potential (AP) and Carbonate Neutralization Potential (CaNP) for a specific rock type. The y-axis for all plots is 'Acid Potential, AP (t CaCO₃/1000 t)' and the x-axis is 'Carbonate Neutralization Potential, CaNP (t CaCO₃/1000 t)'. Each plot features a horizontal blue line at AP = 0.3, labeled 'Sulphide Content = 0.3 wt% as S'. Three red diagonal lines originate from the origin, defining four zones: 'LIKELY' (top), 'POSSIBLE' (middle), 'LOW' (bottom), and 'NONE' (bottom-right). Data points are represented by green triangles.

- EASTERN GABBRO:** The y-axis ranges from 0 to 150, and the x-axis from 0 to 150. Most data points are clustered near the origin, with one outlier at approximately (5, 125) in the 'LIKELY' zone.
- TWO DUCK LAKE GABBRO:** The y-axis ranges from 0 to 120, and the x-axis from 0 to 120. Data points are mostly near the origin, with one outlier at approximately (15, 110) in the 'LIKELY' zone.
- VOLCANIC:** The y-axis ranges from 0 to 300, and the x-axis from 0 to 300. Data points are scattered, with several in the 'LIKELY' and 'POSSIBLE' zones, and others near the origin.
- HETEROLITHIC BRECCIA:** The y-axis ranges from 0 to 40, and the x-axis from 0 to 40. Data points are mostly near the origin, with a few in the 'POSSIBLE' and 'LOW' zones.
- SYENITE:** The y-axis ranges from 0 to 50, and the x-axis from 0 to 50. Data points are mostly near the origin, with one outlier at approximately (45, 5) in the 'NONE' zone.
- SERPENTINITE:** The y-axis ranges from 0 to 50, and the x-axis from 0 to 50. Data points are mostly near the origin, with one outlier at approximately (30, 0) on the x-axis.

Page 1 of 1

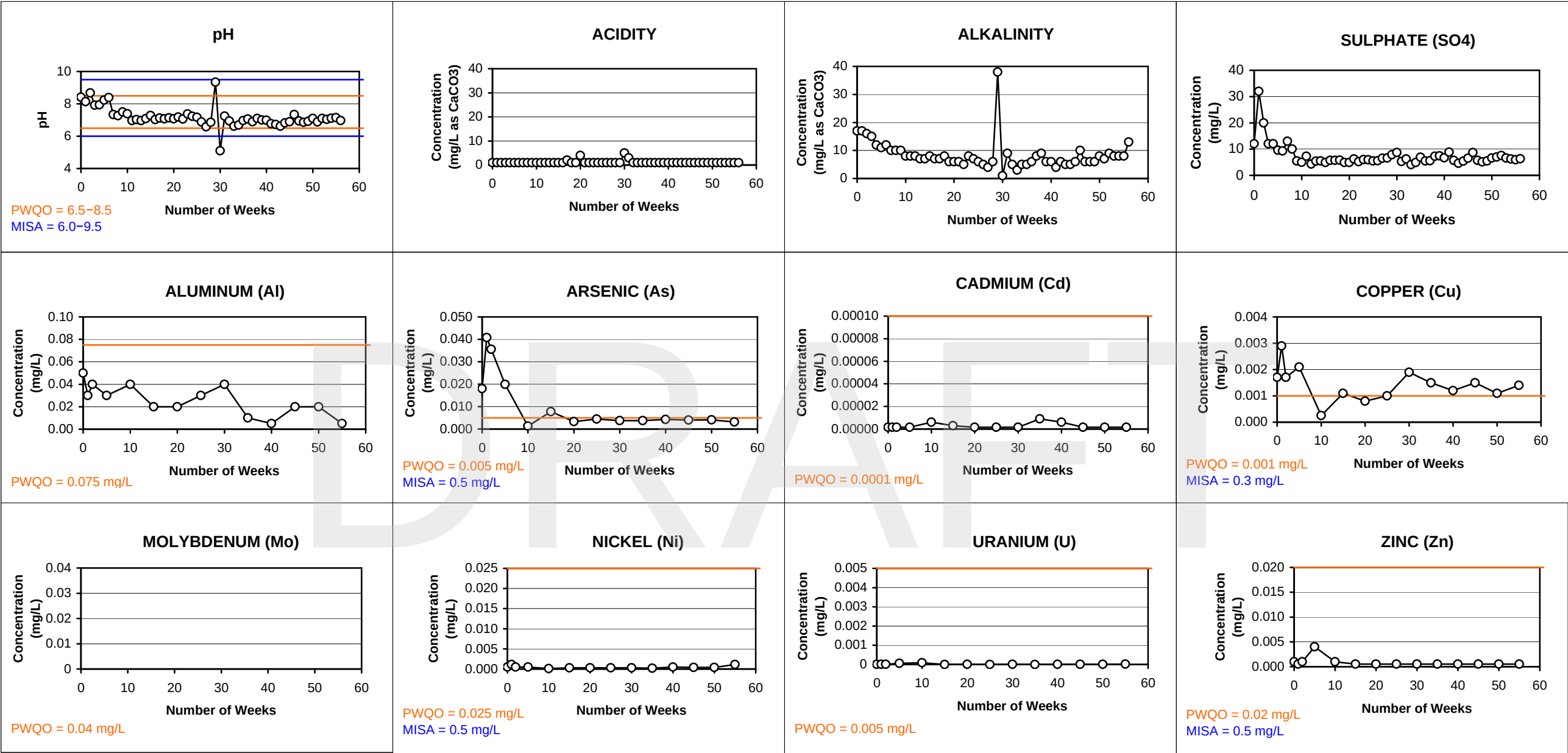
FIGURE 8
GEOCHEMISTRY OF HUMIDITY CELL MAR07-18: EASTERN GABBRO
MARATHON PGM-Cu PROJECT



— Provincial Water Quality Objectives — MISA Discharge Limits

ABA & Depletion Data
Sulphide Content: 0.09 wt% as S
NP: 38.4 t CaCO₃/1000 t
CaNP: 8.99 t CaCO₃/1000 t
AP: 2.8 t CaCO₃/1000 t
NP/AP: 14
Time to depletion for AP: 33 year
Time to depletion for NP: 50 year

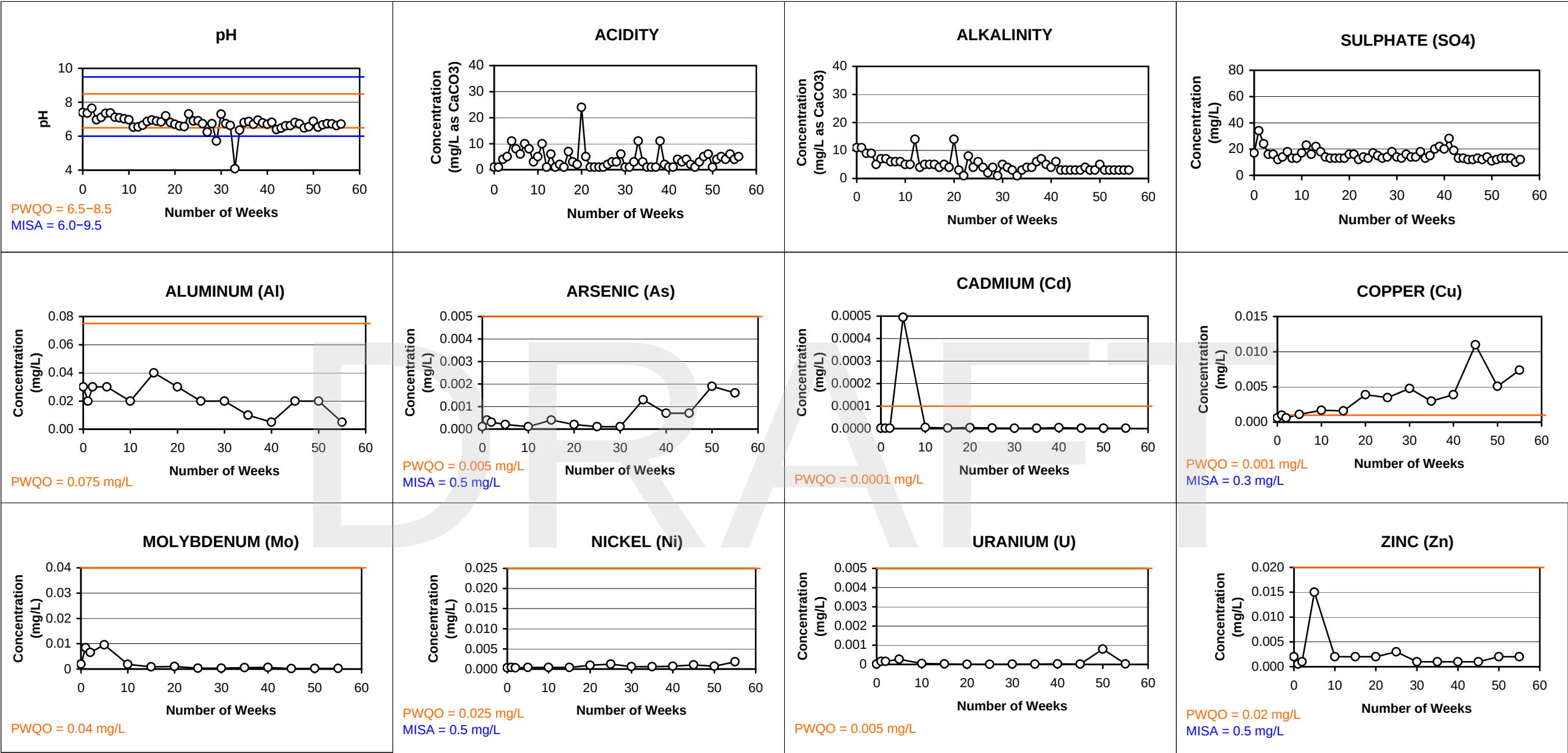
FIGURE 9
GEOCHEMISTRY OF HUMIDITY CELL MAR07-99: EASTERN GABBRO
MARATHON PGM-Cu PROJECT



— Provincial Water Quality Objectives — MISA Discharge Limits

ABA & Depletion Data
Sulphide Content: 0.36 wt% as S
NP: 39.6 t CaCO₃/1000 t
CaNP: 12.676 t CaCO₃/1000 t
AP: 11.3 t CaCO₃/1000 t
NP/AP: 3.5
Time to depletion for AP: 32 year
Time to depletion for NP: 52 year

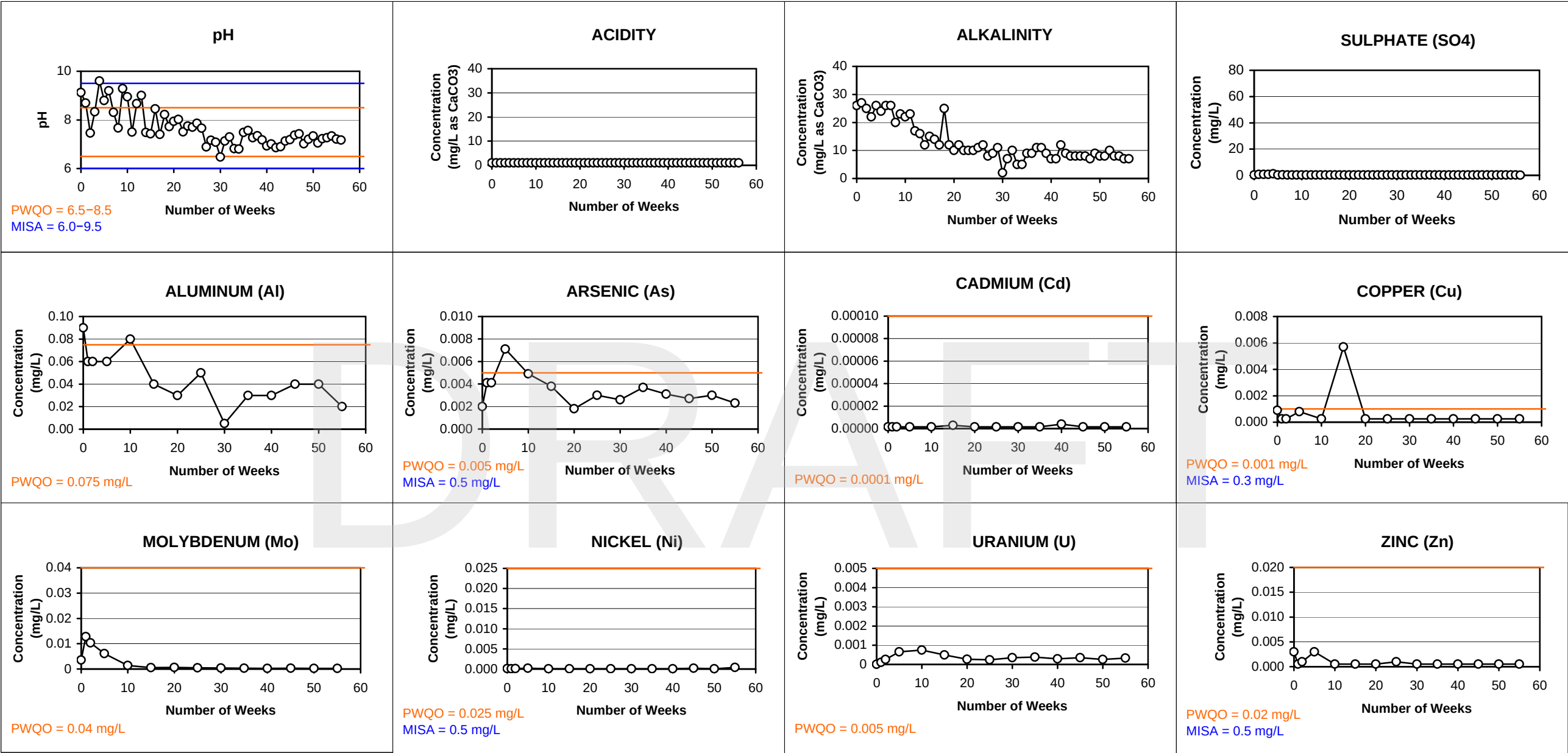
FIGURE 10
GEOCHEMISTRY OF HUMIDITY CELL MAR07-16: EASTERN GABBRO
MARATHON PGM-Cu PROJECT



— Provincial Water Quality Objectives — MISA Discharge Limits

ABA & Depletion Data
Sulphide Content: 4.02 wt% as S
NP: 18.2 t CaCO3/1000 t
CaNP: 2.685 t CaCO3/1000 t
AP: 126 t CaCO3/1000 t
NP/AP: 0.2
Time to depletion for AP: 214 year
Time to depletion for NP: 35 year

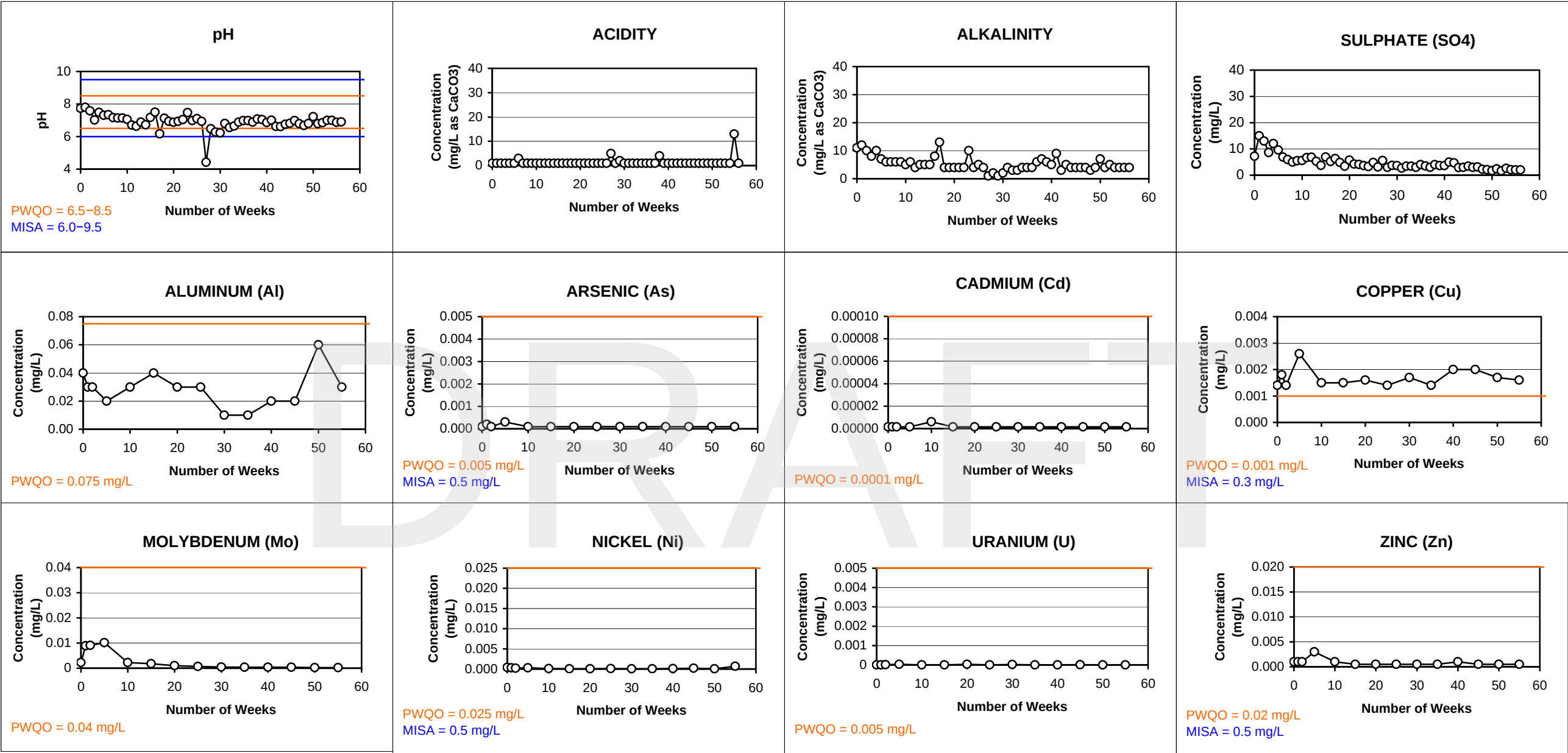
FIGURE 11
GEOCHEMISTRY OF HUMIDITY CELL MAR07-98: TWO DUCK LAKE GABBRO
MARATHON PGM-Cu PROJECT



— Provincial Water Quality Objectives — MISA Discharge Limits

ABA & Depletion Data
Sulphide Content: 0.01 wt% as S
NP: 51 t CaCO₃/1000 t
CaNP: 34.692 t CaCO₃/1000 t
AP: 0.31 t CaCO₃/1000 t
NP/AP: 164
Time to depletion for AP: 26 year
Time to depletion for NP: 155 year

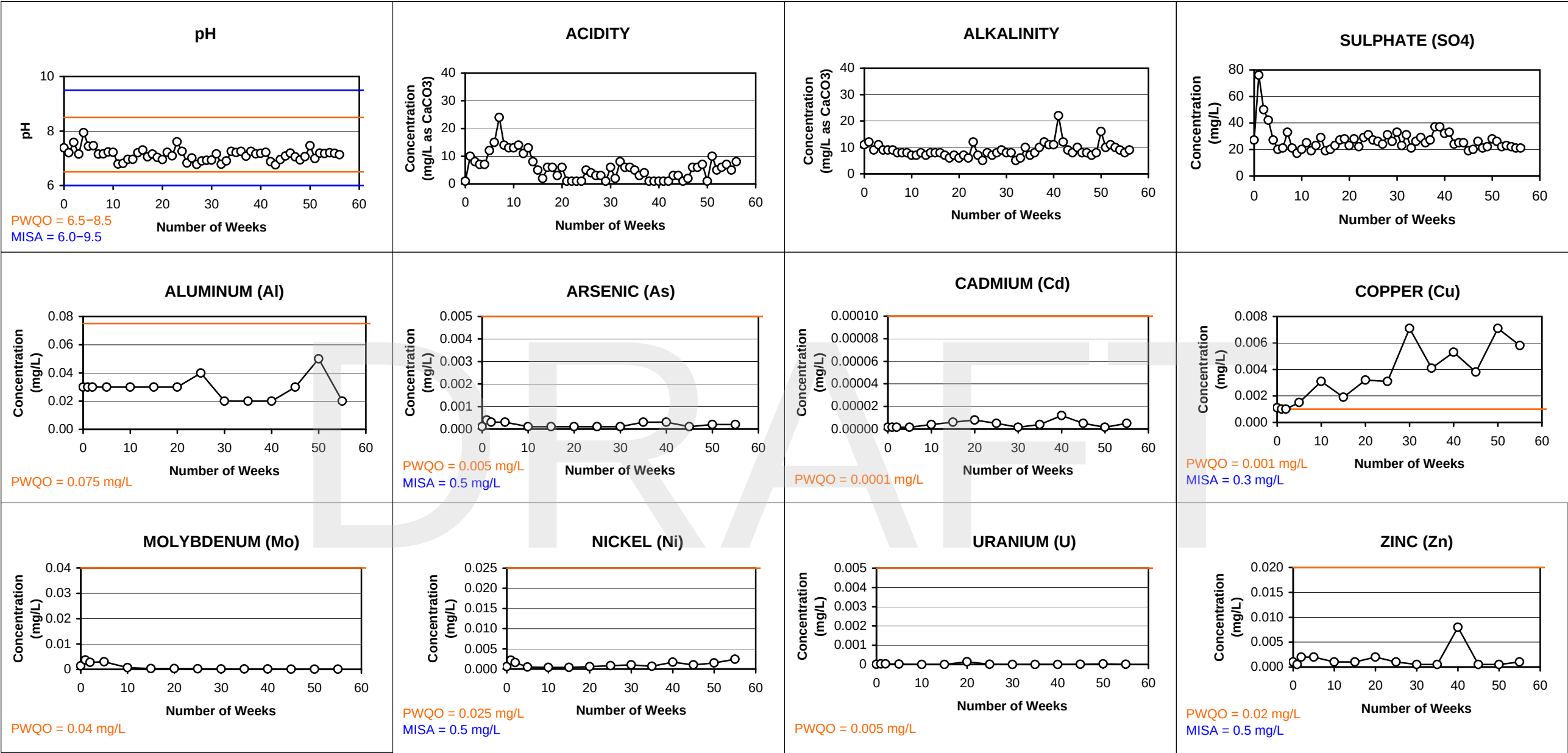
FIGURE 12
GEOCHEMISTRY OF HUMIDITY CELL MAR07-80: TWO DUCK LAKE GABBRO
MARATHON PGM-Cu PROJECT



— Provincial Water Quality Objectives — MISA Discharge Limits

ABA & Depletion Data
Sulphide Content: 0.19 wt% as S
NP: 47.3 t CaCO₃/1000 t
CaNP: 3.936 t CaCO₃/1000 t
AP: 6 t CaCO₃/1000 t
NP/AP: 7.9
Time to depletion for AP: 58 year
Time to depletion for NP: 354 year

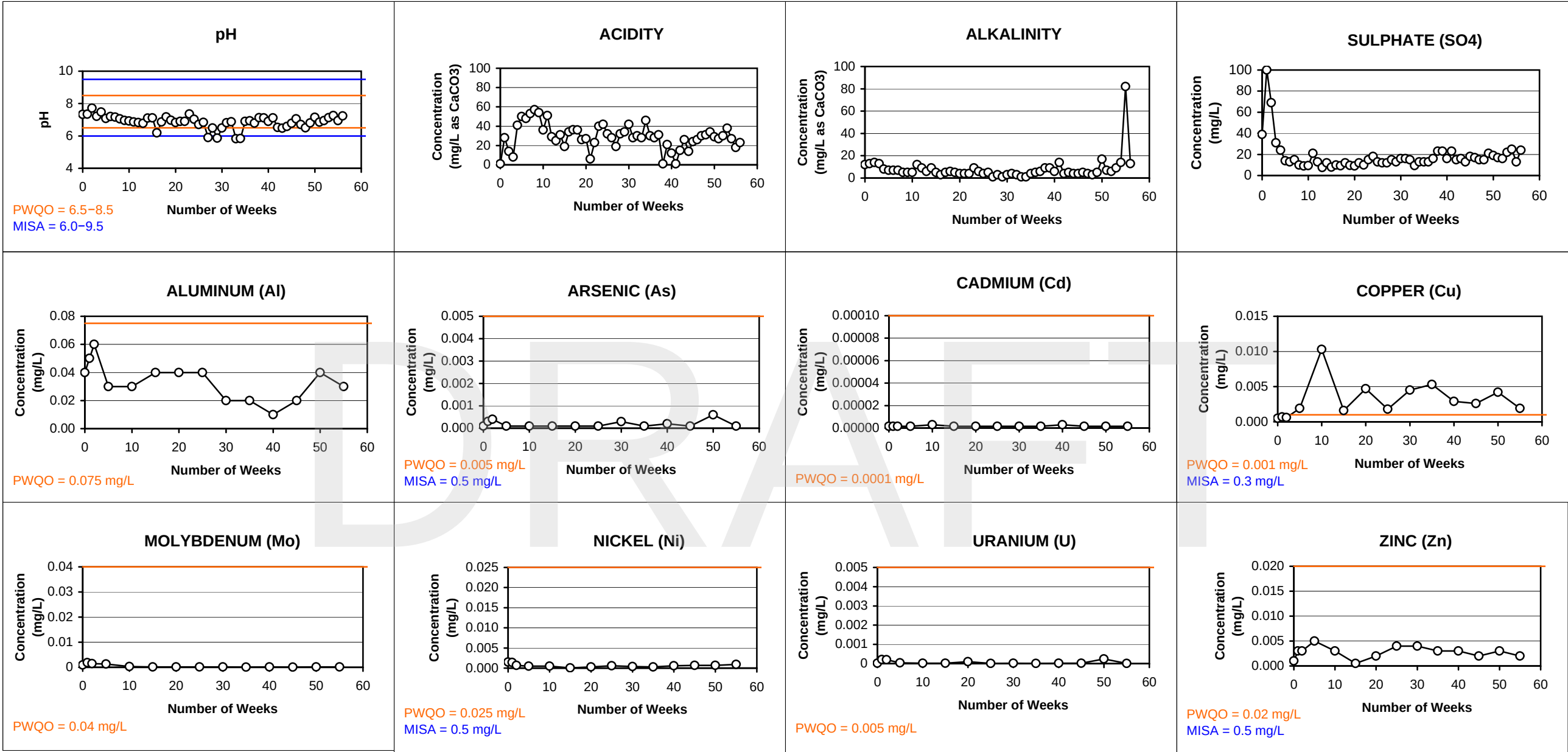
FIGURE 13
GEOCHEMISTRY OF HUMIDITY CELL MAR07-15: TWO DUCK LAKE GABBRO
MARATHON PGM-Cu PROJECT



— Provincial Water Quality Objectives — MISA Discharge Limits

Relevant Information
Sulphide Content: 3.52 wt% as S
NP: 25.9 t CaCO₃/1000 t
CaNP: 14.377 t CaCO₃/1000 t
AP: 110 t CaCO₃/1000 t
NP/AP: 0.2
Time to depletion for AP: 102 year
Time to depletion for NP: 20 year

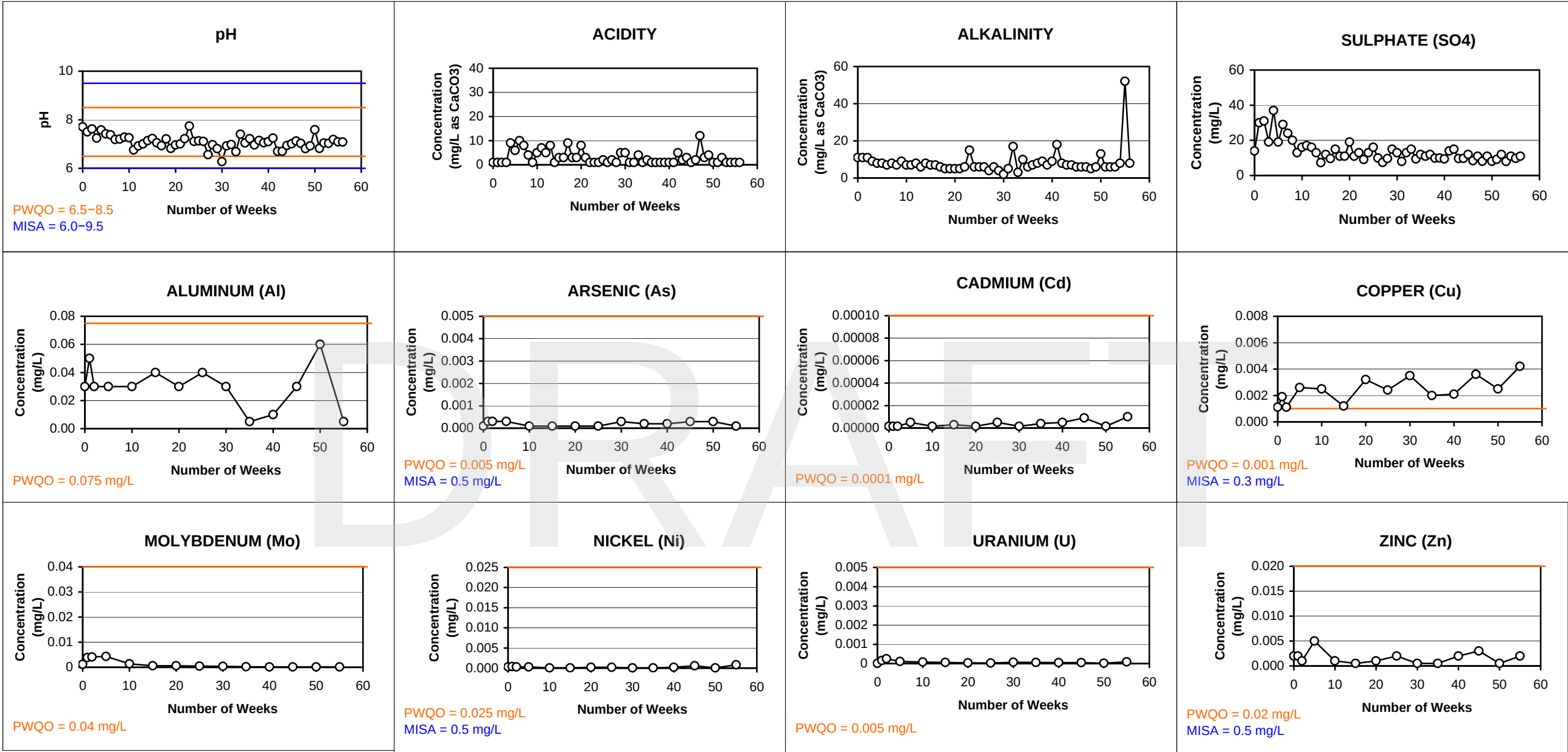
FIGURE 14
GEOCHEMISTRY OF HUMIDITY CELL MAR07-96: VOLCANIC
MARATHON PGM-Cu PROJECT



— Provincial Water Quality Objectives — MISA Discharge Limits

ABA & Depletion Data
Sulphide Content: 6.34 wt% as S
NP: 19.9 t CaCO₃/1000 t
CaNP: 1.951 t CaCO₃/1000 t
AP: 198 t CaCO₃/1000 t
NP/AP: 0.1
Time to depletion for AP: 193 year
Time to depletion for NP: 19 year

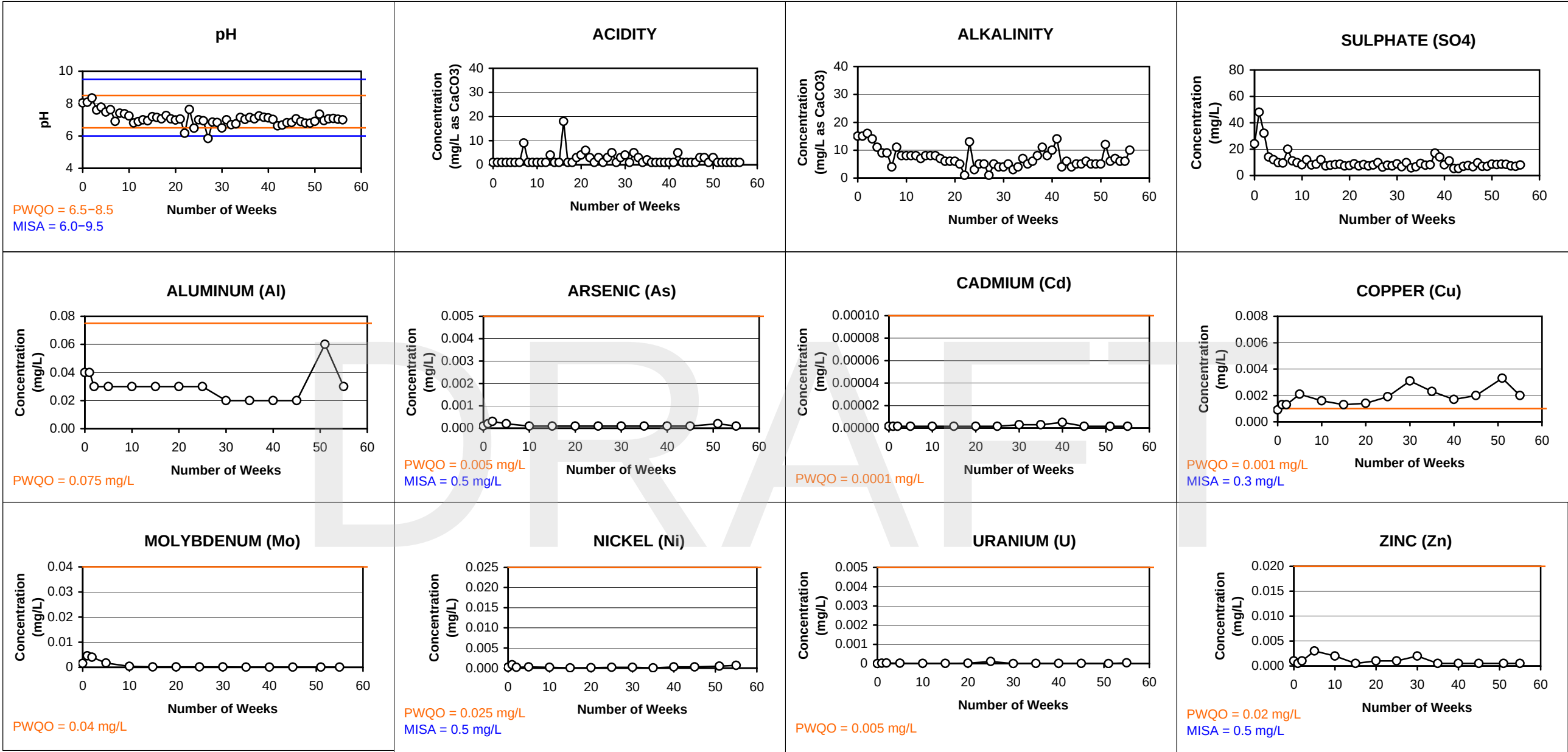
FIGURE 15
GEOCHEMISTRY OF HUMIDITY CELL MAR07-33: VOLCANIC
MARATHON PGM-Cu PROJECT



— Provincial Water Quality Objectives — MISA Discharge Limits

ABA & Depletion Data
Sulphide Content: 1.63 wt% as S
NP: 36.1 t CaCO₃/1000 t
CaNP: 5.954 t CaCO₃/1000 t
AP: 51 t CaCO₃/1000 t
NP/AP: 0.7
Time to depletion for AP: 95 year
Time to depletion for NP: 28 year

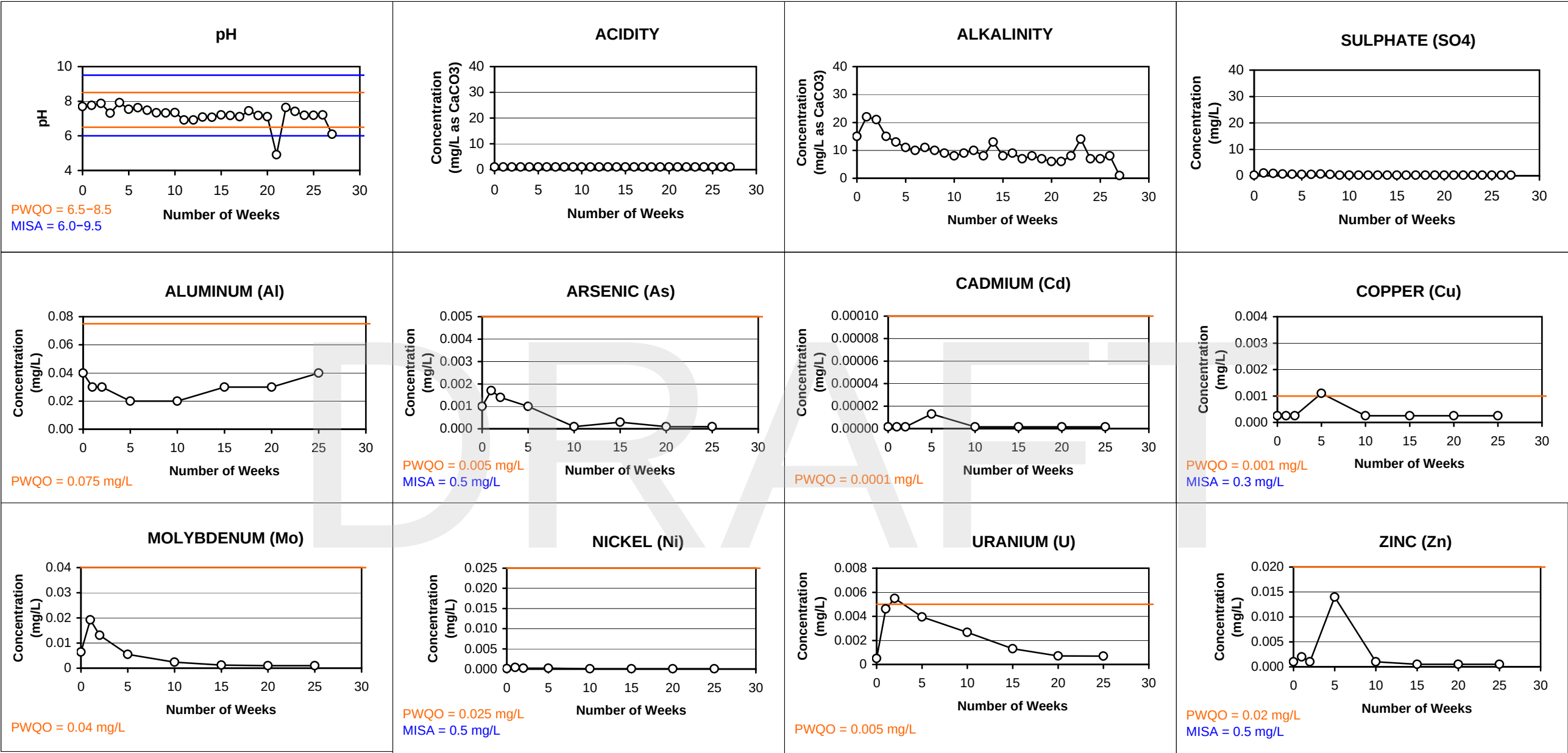
FIGURE 16
GEOCHEMISTRY OF HUMIDITY CELL MAR07-49: HETEROLITHIC BRECCIA
MARATHON PGM-Cu PROJECT



— Provincial Water Quality Objectives — MISA Discharge Limits

ABA & Depletion Data
Sulphide Content: 0.71 wt% as S
NP: 28.4 t CaCO₃/1000 t
CaNP: 4.753 t CaCO₃/1000 t
AP: 22.1 t CaCO₃/1000 t
NP/AP: 1.3
Time to depletion for AP: 58 year
Time to depletion for NP: 43 year

FIGURE 17
GEOCHEMISTRY OF HUMIDITY CELL MAR07-92: SYENITE
MARATHON PGM-Cu PROJECT



— Provincial Water Quality Objectives — MISA Discharge Limits

ABA & Depletion Data
Sulphide Content: 0.01 wt% as S
NP: 19.5 t CaCO₃/1000 t
CaNP: 10.7912400399143 t CaCO₃/1000 t
AP: 0.31 t CaCO₃/1000 t
NP/AP: 63
Time to depletion for AP: 25 year
Time to depletion for NP: 62 year

FIGURE 18
SULPHIDE CONTENT vs. PASTE pH: TAILINGS
MARATHON PGM-Cu PROJECT

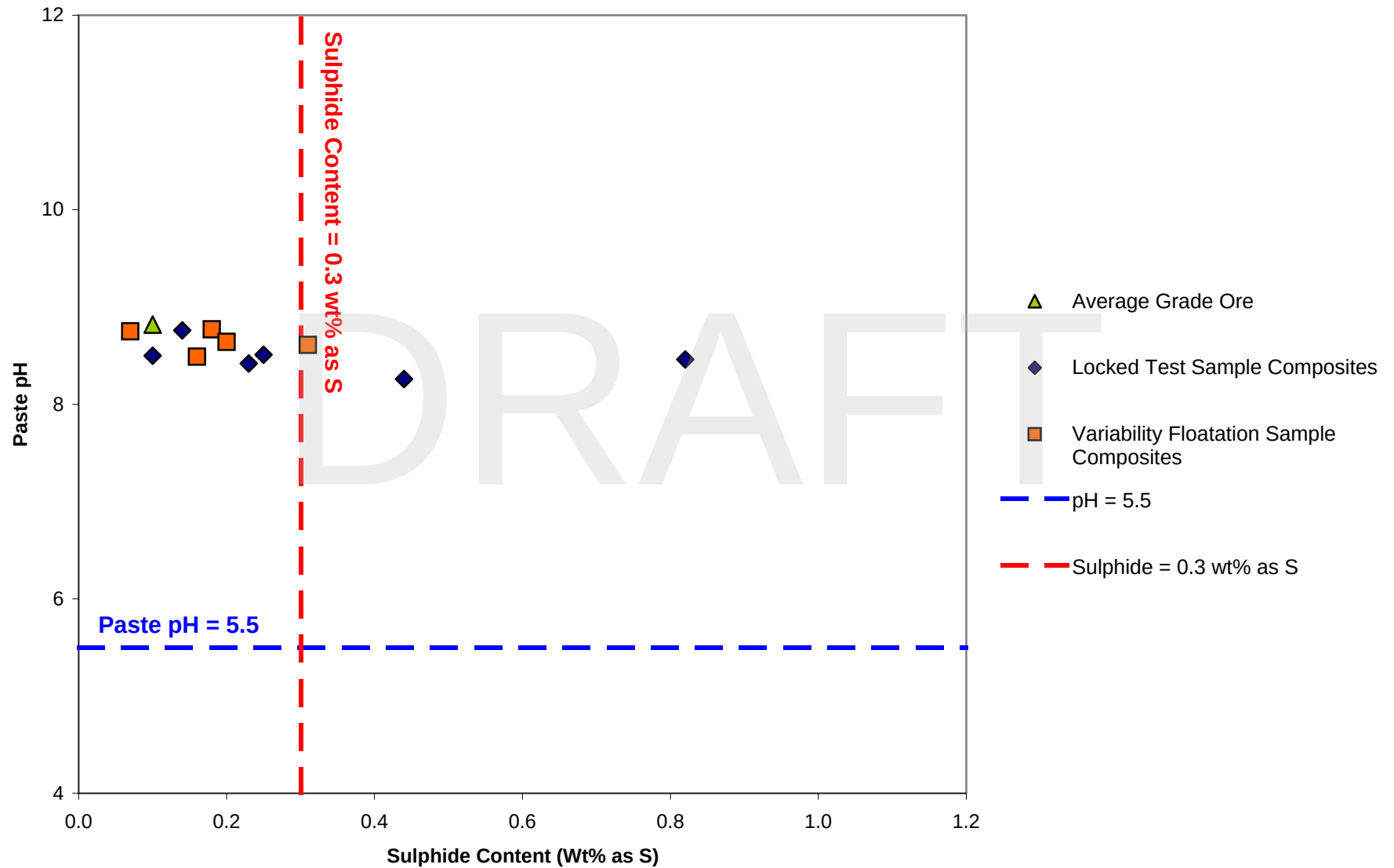
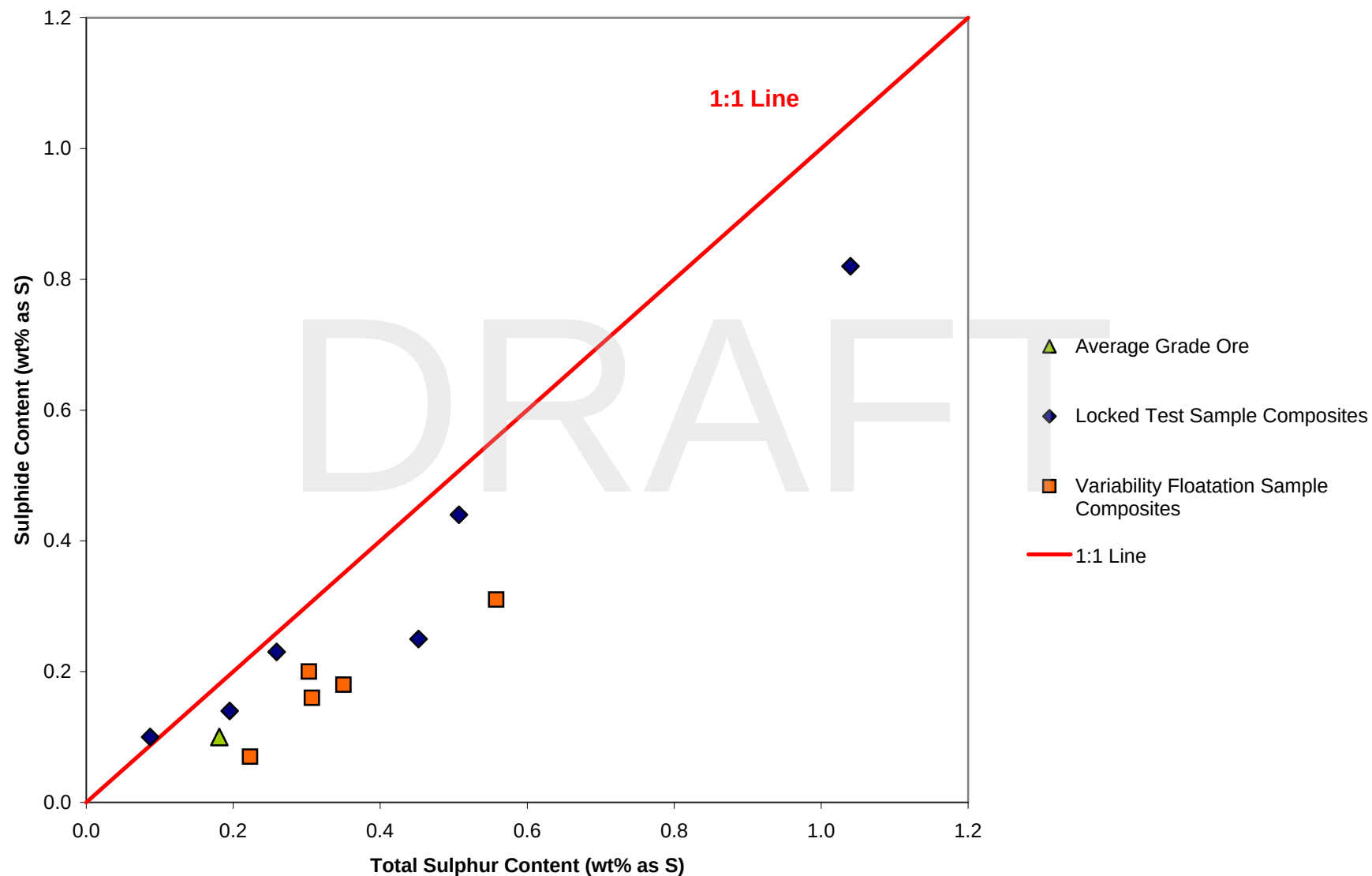


FIGURE 19
TOTAL SULPHUR CONTENT vs. SULPHIDE CONTENT: TAILINGS
MARATHON PGM-Cu PROJECT



**NEUTRALIZATION POTENTIAL (NP) vs. CARBONATE NEUTRALIZATION POTENTIAL (CaNP): TAILINGS
MARATHON PGM-Cu PROJECT**

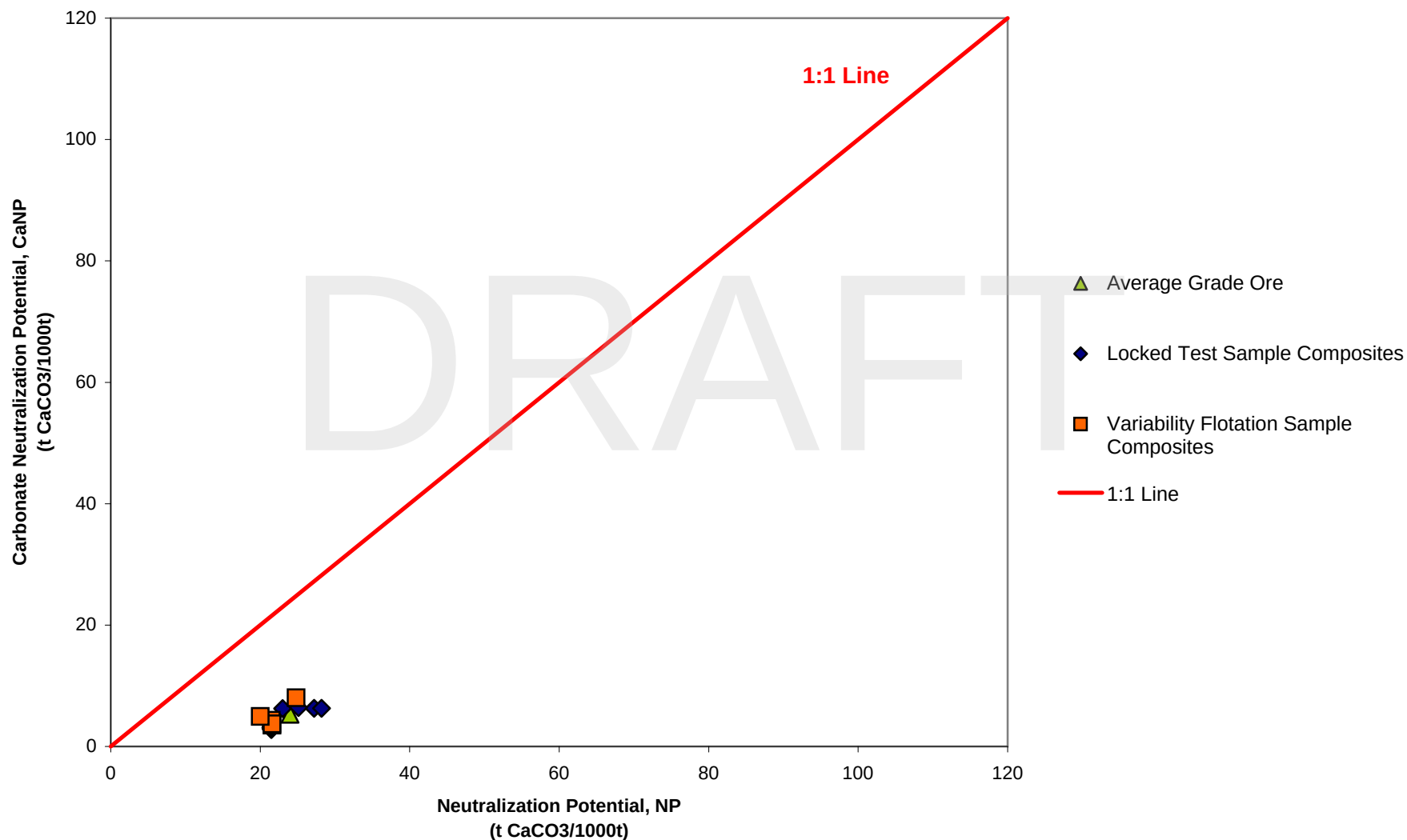
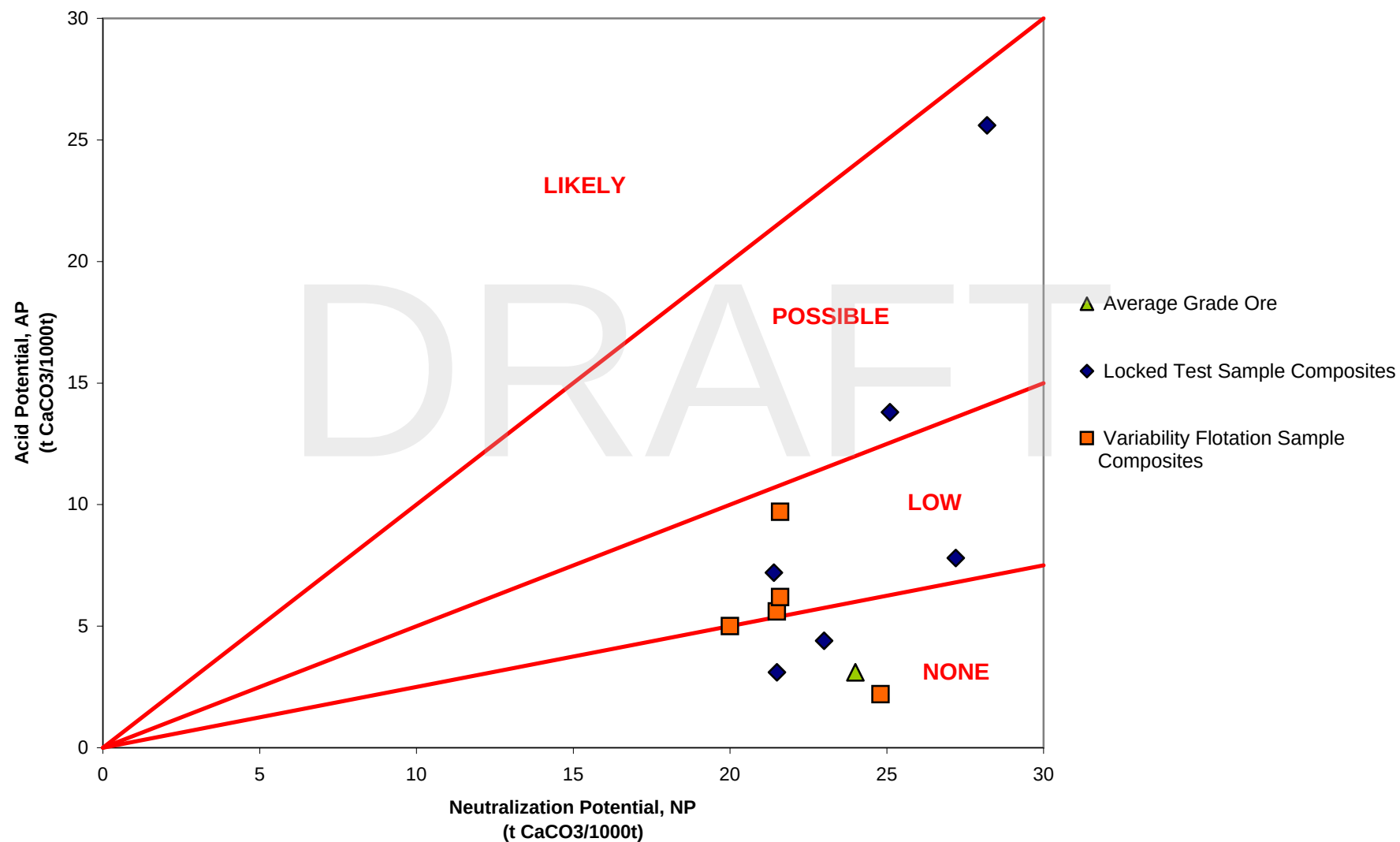


FIGURE 21
NEUTRALIZATION POTENTIAL (NP) vs. ACID POTENTIAL (AP): TAILINGS
MARATHON PGM-Cu PROJECT



**CARBONATE NEUTRALIZATION POTENTIAL (CaNP) vs. ACID POTENTIAL (AP): TAILINGS
MARATHON PGM-Cu PROJECT**

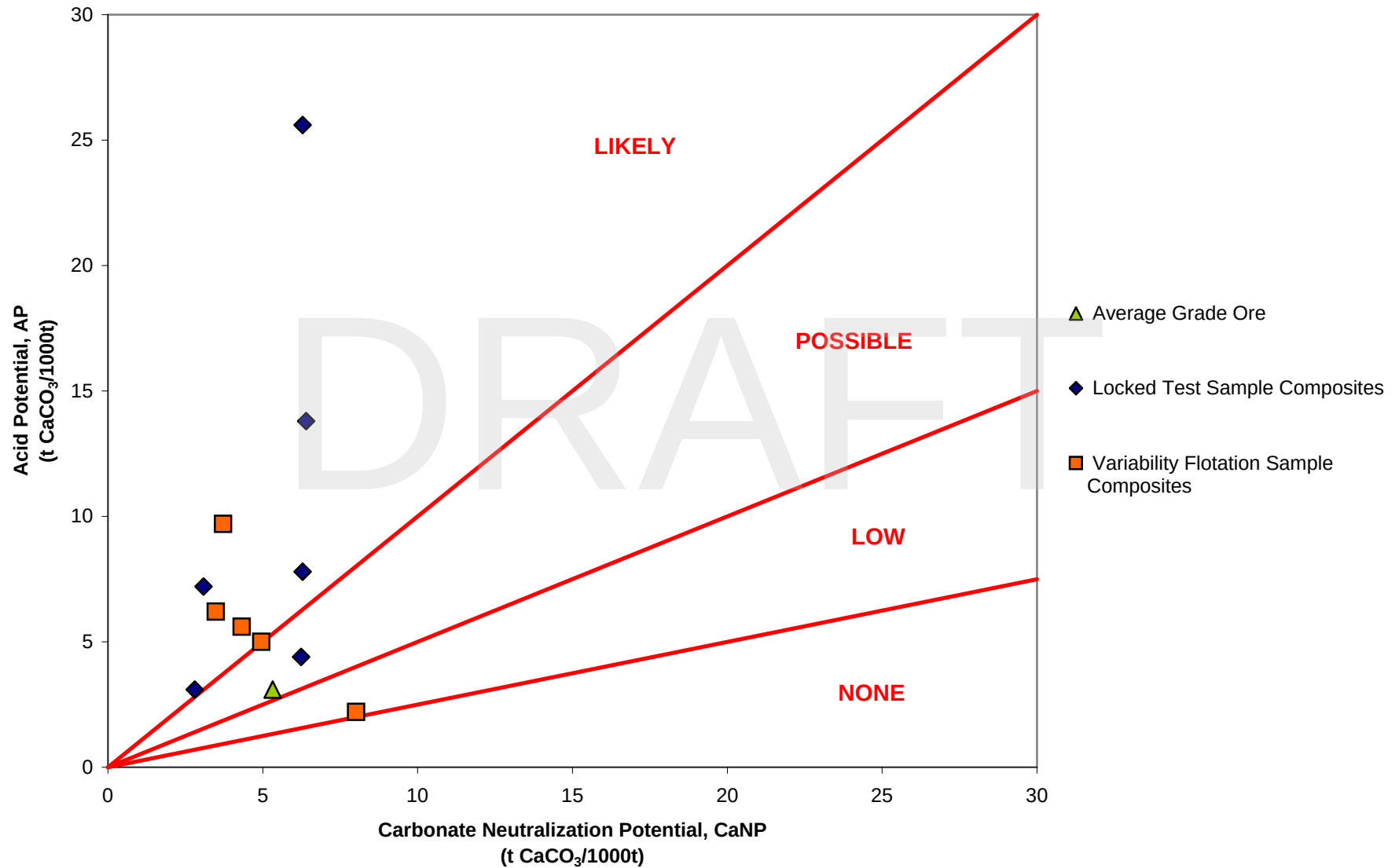
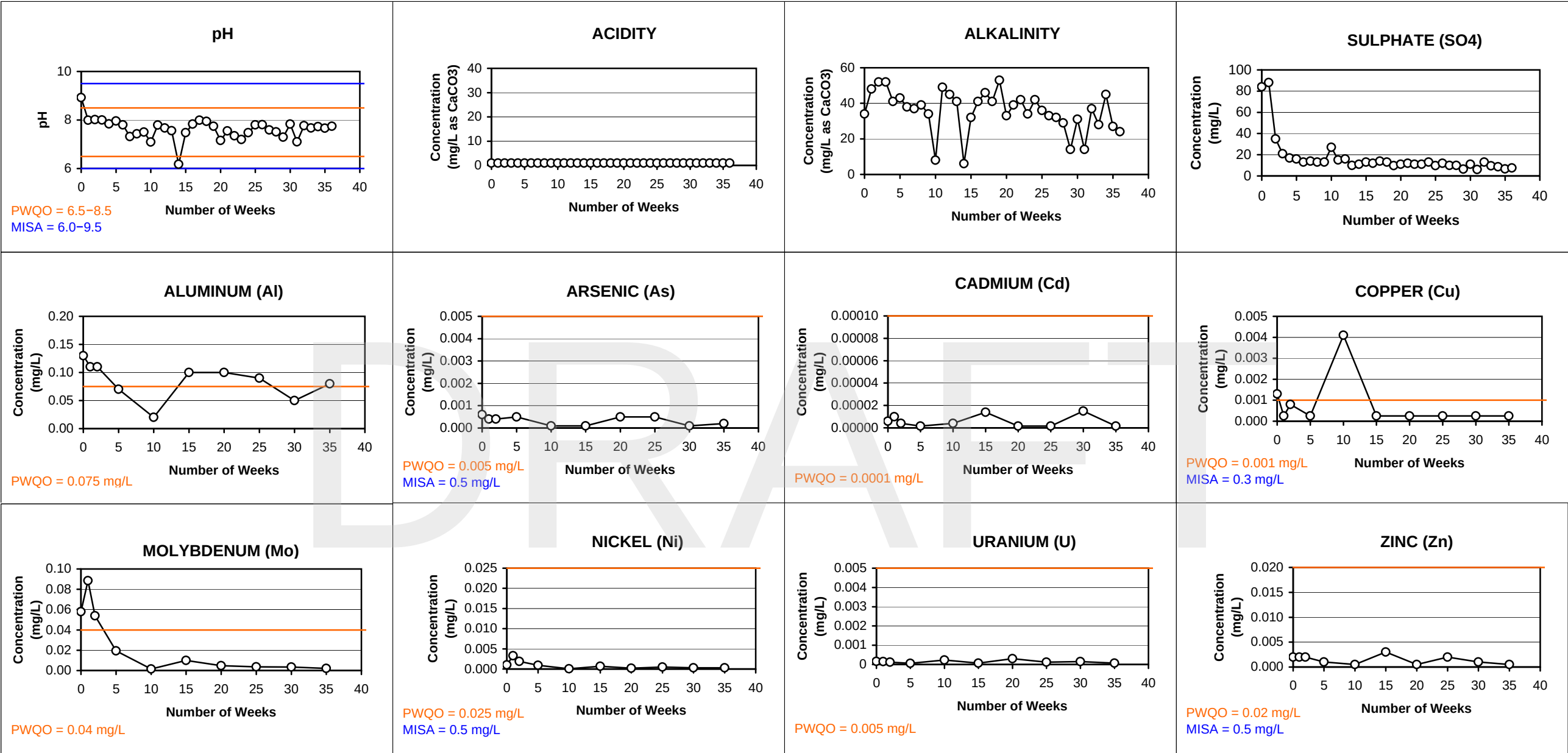


FIGURE 23
GEOCHEMISTRY OF HUMIDITY CELL MAR07-Tailings: TAILINGS
MARATHON PGM-Cu PROJECT



— Provincial Water Quality Objectives — MISA Discharge Limits

ABA & Depletion Data

Sulphide Content: 0.1 wt% as S
NP: 24 t CaCO₃/1000 t
CaNP: 5.31 t CaCO₃/1000 t
AP: 3.1 t CaCO₃/1000 t
NP/AP: 7.74193548387097
Time to depletion for AP: 5 year
Time to depletion for NP: 11 year

APPENDIX A
COMPLETE LIST OF SAMPLES SELECTED
FOR GEOCHEMICAL TESTING

TABLE A1
DETAILS OF CORE SAMPLES SELECTED FOR STATIC TESTING
MARATHON PGM-Cu PROJECT

SAMPLE ID	CORE	DEPTH INTERVAL		ROCK TYPE	
		FROM	TO	CODE	DESCRIPTION
EASTERN GABBRO (n = 57)					
MAR07-01	M-07-312	87	98	2a	Fine grained gabbro.
MAR07-03	M-06-202	1.5	10.5	2d	Fine grained gabbro with coarse grained gabbro dikelets.
MAR07-04	M-06-202	10.5	19.4	2a, 2d	Fine grained gabbro, fine grained gabbro; coarse grained gabbro dikelets.
MAR07-05	M-06-202	36	45	2a	Fine grained gabbro.
MAR07-06	M-06-202	67	75	2d	Fine grained gabbro with coarse grained gabbro dikelets.
MAR07-07	M-06-202	72	80.1	2a	Fine grained gabbro.
MAR07-08	M-06-202	81.55	86.1	2a	Fine grained gabbro.
MAR07-10	M-06-202	90.3	99	2a, 3a, 3b	Fine grained gabbro; fine to medium grained gabbro (<5 mm); coarse grained gabbro (>5 mm).
MAR07-12	M-06-202	104	109	2a	Fine grained gabbro.
MAR07-16	M-06-202	321	324	2a, 1a	Fine grained gabbro; footwall volcanics.
MAR07-18	M-06-222	26	37	2a (minor 2f)	Fine grained gabbro, medium to coarse grained magnetite-rich gabbro; minor medium to coarse grained magnetite-rich gabbro.
MAR07-23	M-06-223	12.7	21.5	2d, 2a	Fine grained gabbro with coarse grained gabbro dikelets; fine grained gabbro.
MAR07-24	M-06-223	39	47	2d, 2a	Fine grained gabbro with coarse grained gabbro dikelets; fine grained gabbro.
MAR07-25	M-06-223	78.2	87	2d	Fine grained gabbro with coarse grained gabbro dikelets.
MAR07-27	M-06-223	243	251	2a	Fine grained gabbro.
MAR07-32	M-06-223	217	226	2d	Fine grained gabbro with coarse grained gabbro dikelets.
MAR07-36	M-06-224	15	23.9	2f	Medium to coarse grained magnetite-rich gabbro.
MAR07-37	M-06-225	0	9.5	2a	Fine grained gabbro.
MAR07-38	M-06-225	39	48.7	2a, 2d	Fine grained gabbro; fine grained gabbro with coarse grained gabbro dikelets.
MAR07-39	M-06-225	57	66	2a, 2f, 2d	Fine grained gabbro; medium to coarse grained magnetite-rich gabbro; fine grained gabbro with coarse grained gabbro dikelets.
MAR07-42	M-06-225	168	171	2a	Fine grained gabbro.
MAR07-43	M-06-225	71	79	2a, 2d	Fine grained gabbro.
MAR07-44	M-06-225	79	88	2a, 2d	Fine grained gabbro; fine grained gabbro with coarse grained gabbro dikelets.
MAR07-45	M-06-225	105	107	2f	Medium to coarse grained magnetite-rich gabbro.
MAR07-46	M-06-225	108	118	2a, 2d	Fine grained gabbro; fine grained gabbro with coarse grained gabbro dikelets.
MAR07-48	M-06-225	192	201	2d	Fine grained gabbro with coarse grained gabbro dikelets.
MAR07-50	M-06-226	28	33	2b, 2a	Fine grained gabbro with layering, fine grained gabbro.
MAR07-51	M-06-226	66	72	2a	Fine grained gabbro.
MAR07-53	M-06-220	6.9	11.2	2a (minor 2f)	Fine grained gabbro; minor medium to coarse grained magnetite-rich gabbro.
MAR07-54	M-06-220	12	20	2d	Fine grained gabbro with coarse grained gabbro dikelets.

TABLE A1
DETAILS OF CORE SAMPLES SELECTED FOR STATIC TESTING
MARATHON PGM-Cu PROJECT

SAMPLE ID	CORE	DEPTH INTERVAL		ROCK TYPE	
		FROM	TO	CODE	DESCRIPTION
MAR07-55	M-06-220	24	37	2a (minor 2f & 3b)	Fine grained gabbro; minor medium to coarse grained magnetite-rich gabbro and coarse grained gabbro (>5 mm).
MAR07-56	M-06-220	37	50	2a (minor 2f & 3b)	Fine grained gabbro; minor medium to coarse grained magnetite-rich gabbro and coarse grained gabbro (>5 mm).
MAR07-57	M-06-220	106	120	2a	Fine grained gabbro.
MAR07-58	M-06-220	53	59	2d	Fine grained gabbro with coarse grained gabbro dikelets.
MAR07-59	M-06-220	135	141	2a (minor 3a)	Fine grained gabbro; minor fine to medium grained gabbro (<5 mm).
MAR07-60	M-06-220	141	159	2e (minor 2c)	Medium to coarse grained gabbro; minor fine grained gabbro with cpx/ol porphyroblast.
MAR07-61	M-06-220	163	165	2a (minor 3b)	Fine grained gabbro; minor coarse grained gabbro (>5 mm).
MAR07-62	M-06-220	165	175	2c (minor 3b)	Fine grained gabbro with cpx/ol porphyroblast; minor coarse grained gabbro (>5 mm).
MAR07-64	M-06-220	232	240	2d	Fine grained gabbro with coarse grained gabbro dikelets.
MAR07-65	M-06-220	240	250	2a (minor 3b & 5a)	Fine grained gabbro; minor coarse grained gabbro (>5 mm) and quartz syenite dikelets.
MAR07-70	M-07-306	58	71	2a	Fine grained gabbro.
MAR07-71	M-07-319	2.88	11.5	2a	Fine grained gabbro.
MAR07-72	M-07-319	11.5	20	2f	Medium to coarse grained magnetite-rich gabbro.
MAR07-78	M-06-153	5	15	2a	Fine grained gabbro.
MAR07-82	M-06-160	76	84	2e, 2a, 2d	Medium to coarse grained gabbro, fine grained gabbro, fine grained gabbro with coarse grained gabbro dikelets.
MAR07-83	M-06-152	23	32	2c	Fine grained gabbro with cpx/ol porphyroblast.
MAR07-85	M-06-150	23	31	2c	Fine grained gabbro with cpx/ol porphyroblast.
MAR07-87	M-06-210	15	19	2b, 2c	Fine grained gabbro with layering; fine grained gabbro with cpx/ol porphyroblast.
MAR07-89	M-06-210	80	87	2d	Fine grained gabbro with coarse grained gabbro dikelets.
MAR07-91	M-06-227	10	15	2a	Fine grained gabbro.
MAR07-95	M-06-227	105	114	2a	Fine grained gabbro.
MAR07-97	M-06-227	219	222	2f	Medium to coarse grained magnetite-rich gabbro.
MAR07-99	M-07-306	124	133	2d	Fine grained gabbro with coarse grained gabbro dikelets.
MAR07-101	M-06-227	288	297	2a, 1a	Fine grained gabbro; footwall volcanics.
MAR07-112	M-06-233	9	18	2a	Fine grained gabbro.
MAR07-113	M-06-233	39	48	2e	Medium to coarse grained gabbro.
MAR07-114	M-06-233	161	169	2f	Medium to coarse grained magnetite-rich gabbro.
TWO DUCK LAKE GABBRO (n = 32)					
MAR07-09	M-06-202	86.1	88.7	3a, 3b	Fine to medium grained gabbro (<5 mm); coarse grained gabbro (>5 mm).
MAR07-11	M-06-202	99	104	3a, 2a	Fine to medium grained gabbro (<5 mm); fine grained gabbro.

TABLE A1
DETAILS OF CORE SAMPLES SELECTED FOR STATIC TESTING
MARATHON PGM-Cu PROJECT

SAMPLE ID	CORE	DEPTH INTERVAL		ROCK TYPE	
		FROM	TO	CODE	DESCRIPTION
MAR07-14	M-06-202	124	138	3b	Coarse grained gabbro (>5 mm).
MAR07-15	M-06-202	316	321	3b	Coarse grained gabbro (>5 mm).
MAR07-19	M-06-222	55	66	3a	Fine to medium grained gabbro (<5 mm).
MAR07-21	M-06-222	96	108	3b, 3a	Coarse grained gabbro (>5 mm); fine to medium grained gabbro (<5 mm).
MAR07-22	M-06-223	4	7.6	3c	Coarse grained gabbro with leuco pods.
MAR07-28	M-06-223	156.7	165.1	3b, 4a	Coarse grained gabbro (>5 mm), breccia of Eastern Gabbro fragments in Two Duck Lake Gabbro
MAR07-29	M-06-223	165	174	3b	Coarse grained gabbro (>5 mm).
MAR07-30	M-06-223	177	186	3b	Coarse grained gabbro (>5 mm).
MAR07-31	M-06-223	200	208	3b	Coarse grained gabbro (>5 mm).
MAR07-41	M-06-225	159	164	3a	Fine to medium grained gabbro (<5 mm).
MAR07-47	M-06-225	175	188	3a	Fine to medium grained gabbro (<5 mm).
MAR07-63	M-06-220	175	188	3b (minor 3d & 2e)	Coarse grained gabbro (>5 mm); minor coarse grained to pegmatitic gabbro and medium to coarse grained gabbro.
MAR07-67	M-07-309	91	100	3a	Fine to medium grained gabbro (<5 mm).
MAR07-68	M-07-309	100	108	3a	Fine to medium grained gabbro (<5 mm).
MAR07-69	M-07-309	113	123	3a	Fine to medium grained gabbro (<5 mm).
MAR07-76	M-06-160	41	50	3c	Coarse grained gabbro with leuco pods.
MAR07-77	M-06-160	53	63	3c	Coarse grained gabbro with leuco pods.
MAR07-79	M-06-153	31	40	3b	Coarse grained gabbro (>5 mm).
MAR07-80	M-06-153	53	62	3b	Coarse grained gabbro (>5 mm).
MAR07-84	M-06-150	5	14	3a, 3b	Fine to medium grained gabbro (<5 mm); coarse grained gabbro (>5 mm).
MAR07-86	M-06-152	5	14	3a, 3b	Fine to medium grained gabbro (<5 mm); coarse grained gabbro (>5 mm).
MAR07-88	M-06-210	19	32	3b, 4a	Coarse grained gabbro (>5 mm); breccia of Eastern Gabbro fragments in Two Duck Lake Gabbro.
MAR07-90	M-06-210	87	98	3b	Coarse grained gabbro (>5 mm).
MAR07-93	M-06-228	58	66	3b	Coarse grained gabbro (>5 mm).
MAR07-94	M-06-228	66	75	3b	Coarse grained gabbro (>5 mm).
MAR07-98	M-06-227	223	232	3b, 3a	Coarse grained gabbro (>5 mm); fine to medium grained gabbro (<5 mm).
MAR07-106	M-06-231	68	76	3b, 3d, 3c	Coarse grained gabbro (>5 mm); coarse grained to pegmatitic gabbro; coarse grained gabbro with leuco pods.
MAR07-107	M-06-231	184	192	3b, 2a	Coarse grained gabbro (>5 mm); fine grained gabbro.
MAR07-108	M-06-231	84	102	3b, 3d, 3c	Coarse grained gabbro (>5 mm); coarse grained to pegmatitic gabbro; coarse grained gabbro with leuco pods.

TABLE A1
DETAILS OF CORE SAMPLES SELECTED FOR STATIC TESTING
MARATHON PGM-Cu PROJECT

SAMPLE ID	CORE	DEPTH INTERVAL		ROCK TYPE	
		FROM	TO	CODE	DESCRIPTION
MAR07-109	M-06-231	124	133	3b, 3d, 3c	Coarse grained gabbro (>5 mm); coarse grained to pegmatitic gabbro; coarse grained gabbro with leuco pods.
VOLCANIC (n = 9)					
MAR07-17	M-06-202	323	339	1a, 1b	Footwall volcanics; very fine grained mafic volcanic.
MAR07-33	M-06-223	277	288	1a, 1b	Footwall volcanics; very fine grained mafic volcanic.
MAR07-34	M-06-224	49.5	58.1	1b	Very fine grained mafic volcanic
MAR07-52	M-06-226	138	147	1a	Footwall volcanics.
MAR07-66	M-06-220	302	310	1a (minor 2a)	Footwall volcanics; minor fine grained gabbro.
MAR07-96	M-06-227	301	310	1a, 2a	Footwall volcanics; fine grained gabbro.
MAR07-102	M-06-231	0	9.4	1a	Footwall volcanics.
MAR07-105	M-06-231	56	63	1a	Footwall volcanics.
MAR07-111	M-06-231	257	261	1a	Footwall volcanics.
HETEROLITHIC BRECCIA (n = 7)					
MAR07-02	M-07-213	157	165	4a, 3a, 5a	Breccia of Eastern Gabbro fragments in Two Duck Lake Gabbro; fine to medium grained gabbro (<5 mm), quartz syenite dikelet.
MAR07-35	M-06-224	183.4	192.2	4a (minor 3b, 2f)	Breccia of Eastern Gabbro fragments in Two Duck Lake Gabbro; minor coarse grained gabbro (>5 mm) and medium to coarse grained magnetite-rich gabbro.
MAR07-49	M-06-225	228	232	4a	Breccia of Eastern Gabbro fragments in Two Duck Lake Gabbro.
MAR07-74	M-07-319	76	84	4a	Breccia of Eastern Gabbro fragments in Two Duck Lake Gabbro.
MAR07-81	M-06-155	14	22	4a	Breccia of Eastern Gabbro fragments in Two Duck Lake Gabbro.
MAR07-100	M-06-227	275	280	4a	Breccia of Eastern Gabbro fragments in Two Duck Lake Gabbro.
MAR07-110	M-06-231	248	257	4b	Heterolithic breccia.
SYENITE (n = 7)					
MAR07-13	M-06-202	109	123	5b	Augite syenite.
MAR07-20	M-06-222	83	87.9	5a	Quartz syenite dikelet.
MAR07-26	M-06-223	93	104.6	5a	Quartz syenite dikelet.
MAR07-40	M-06-225	67.75	69.75	5a	Quartz syenite dikelet.
MAR07-73	M-07-319	20	30	5a	Quartz syenite dikelet.
MAR07-75	M-06-160	28	37	5a	Quartz syenite dikelet.
MAR07-92	M-06-227	28	33	5a	Quartz syenite dikelet.
SERPENTINITE (n = 2)					
MAR07-103	M-06-231	13	25	6	Serpentinite.
MAR07-104	M-06-231	35	44	6	Serpentinite.

DRAFT

APPENDIX B
OPTICAL MICROSCOPY

FIGURE B1
Plane-polarized reflected light photomicrograph showing pyrrhotite and pyrite
along with chalcopyrite and sphalerite in sample MAR07-15.

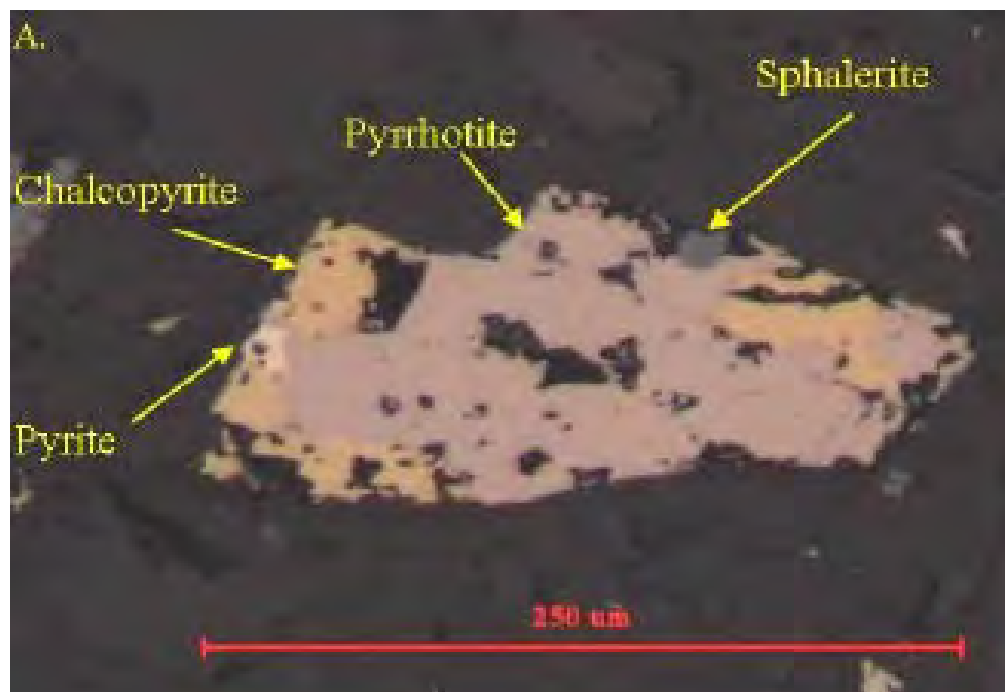


FIGURE B2
Plane-polarized reflected light photomicrograph showing pyrrhotite and pyrite
along with chalcopyrite in sample MAR07-16.



Date: Dec-08
Project: 07-1118-0012 (4000)

Drawn: MRG
Chkd: CMC/KJD

Golder Associates

FIGURE B3
Cross-polarized transmitted light photomicrograph showing calcite in sample MAR07-49.

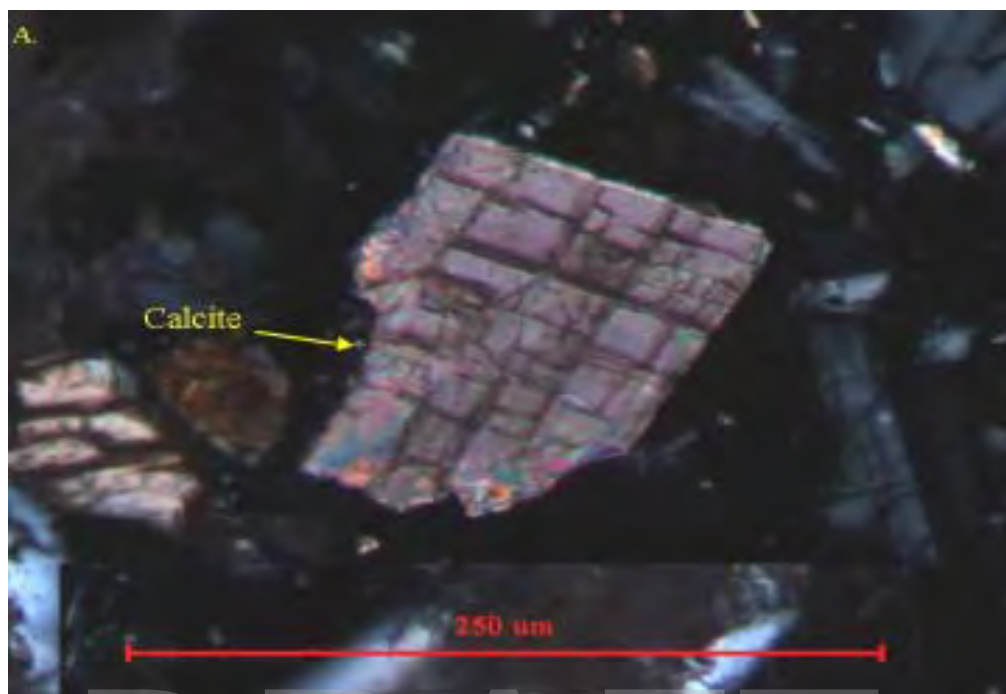


FIGURE B4
Cross-polarized transmitted light photomicrograph showing unidentified carbonate mineral with feldspar in sample MAR07-18.



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Project: 07-1118-0012 (4000)

Drawn: MRG
Chkd: CMC/KJD

Golder Associates

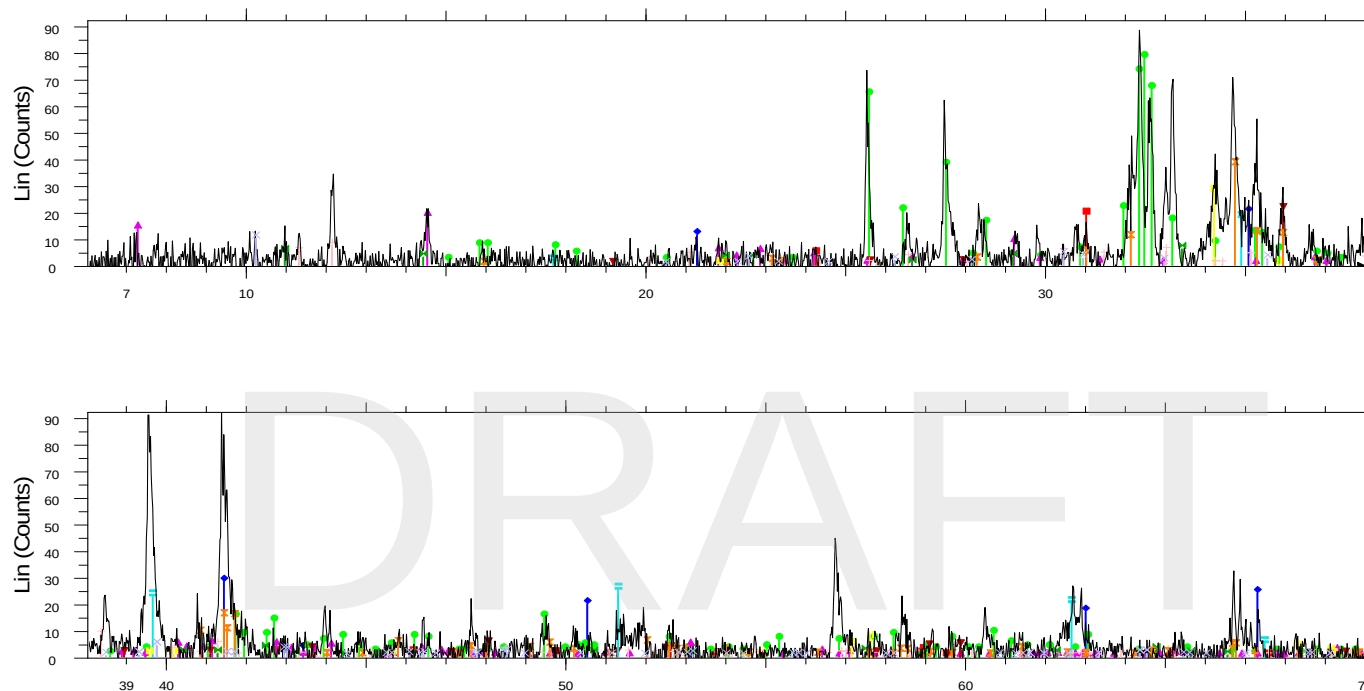
APPENDIX C

QUALITATIVE X-RAY DIFFRACTION SCANS

XRD RESULTS FOR MAR07-15

FIGURE C1

MAR07-15



2-Theta - Scale

- MAR07-15 - File: Nov5019-1.raw - Type: 2Th/Th locked - Start: 6.000 ° - End: 70.00
 01-079-1910 (C) - Quartz - SiO₂
 00-011-0614 (D) - Magnetite - Fe₃O₄
 00-020-0528 (C) - Anorthite, sodian, ordered - (Ca,Na)(Al,Si)₂Si₂O₈
 01-079-1270 (C) - Clinocllore - (Mg_{2.96}Fe_{1.55}Fe_{1.36}Al_{1.275})(Si_{2.622}Al_{1.376}O₁₀)
 01-074-1687 (C) - Dolomite - CaMg(CO₃)₂
 00-022-0358 (D) - Pyrrhotite 5C - Fe_{1-x}S
 00-037-0471 (*) - Chalcopryite - CuFeS₂
 01-080-1109 (C) - Biotite - KFeMg₂(AlSi₃O₁₀)(OH)₂
 01-073-0267 (C) - Tremolite - Ca₂Mg₅Si₈O₂₂(OH)₂
 00-002-0569 (D) - Talc Steatite Soapstone - 3MgO·4SiO₂·H₂O
 01-081-0487 (C) - Diopside - (Ca_{0.959}Ti_{0.041})(Mg_{0.987}Al_{0.013})(Si_{1.905}Al_{0.095}O₆)

DATE: FEBRUARY 2008

CAD: _____

PROJECT: 07-1118-0012 (4000)

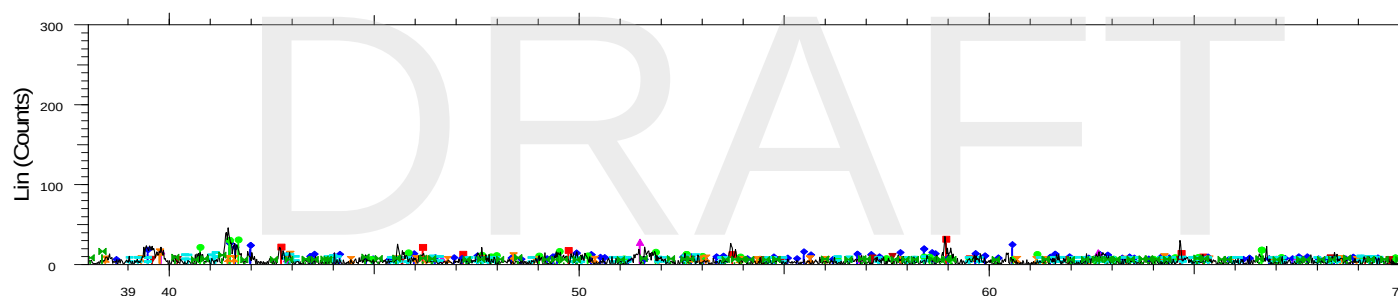
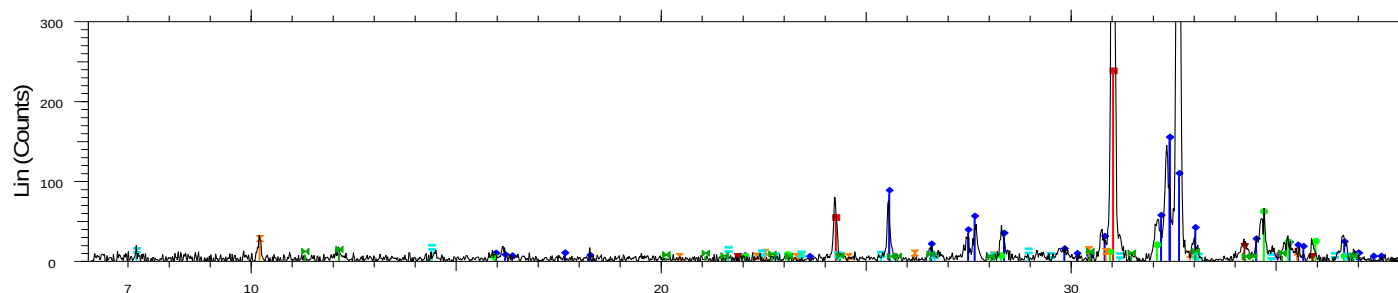


CHK: MRG/KJDF

XRD RESULTS FOR MAR07-16

FIGURE C2

MAR07-16



2-Theta - Scale

- MAR07-16 - File: Nov5019-2.raw - Type: 2Th/Th locked - Start: 6.000 ° - End: 70.00
- 01-079-1910 (C) - Quartz - SiO₂
 - 01-083-1939 (C) - Andesine - Na_{0.685}Ca_{0.347}Al_{1.46}Si_{2.54}O₈
 - 01-086-0932 (C) - Diopside - CaMgSi₂O₆
 - 00-003-1028 (D) - Pyrrhotite - Fe₉S₈
 - 01-071-0507 (C) - Chalcopyrite - CuFeS₂
 - 01-080-1108 (C) - Biotite - KFeMg₂(AlSi₃O₁₀)(OH)₂
 - 01-082-0038 (C) - Clinocllore Ilb-4 (Cr-, Mg-rich) - (Mg_{0.99}Al_{0.01})₅(Al_{0.67}Fe_{0.33})
 - 01-073-0267 (C) - Tremolite - Ca₂Mg₅Si₈O₂₂(OH)₂

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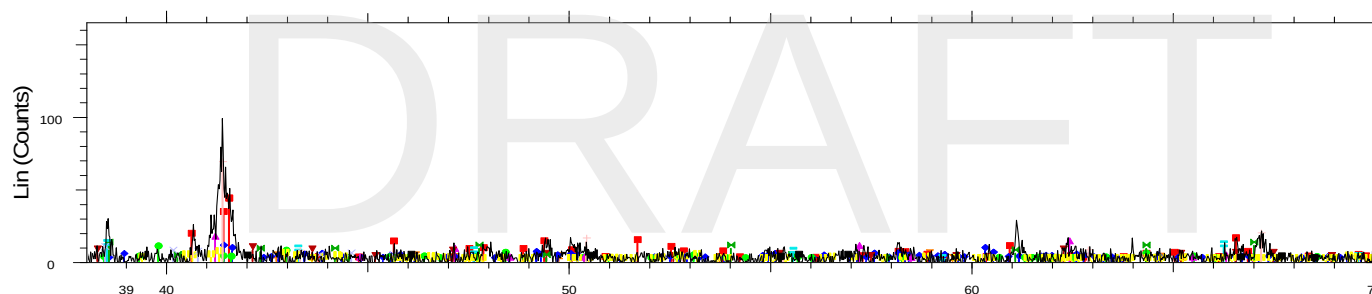
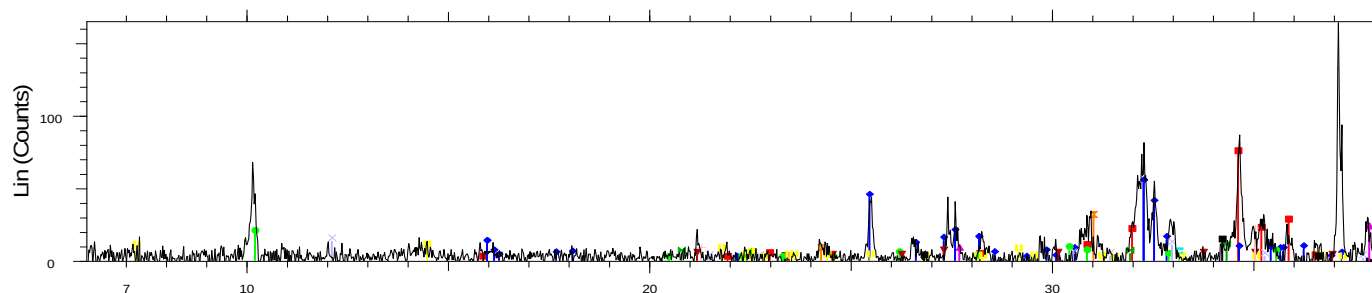


CHK: MRG/KJDF

XRD RESULTS FOR MAR07-18

FIGURE C3

MAR07-18



2-Theta - Scale

- MAR07-18 - File: Nov5019-3.raw - Type: 2Th/Th locked - Start: 6.000 ° - End: 70.00
- 01-079-1910 (C) - Quartz - SiO₂ - I/Ic PDF 3.1 - S-Q 3.9 %
 - 01-071-1494 (C) - Diopside - CaMgSi₂O₆ - I/Ic PDF 1.2 - S-Q 25.1 %
 - 01-071-1152 (C) - Albite high - Na(AlSi₃O₈) - I/Ic PDF 0.6 - S-Q 33.3 %
 - 01-080-1107 (C) - Biotite - KFeMg₂(AlSi₃O₁₀)(OH)₂ - I/Ic PDF 1.4 - S-Q 5.1 %
 - 00-029-0733 (*) - Ilmenite, syn - Fe+2TiO₃ - I/Ic PDF 1.8 - S-Q 4.9 %
 - 00-002-1060 (D) - Olivine - 2(Mg,Fe)O·SiO₂ - I/Ic PDF 1. - S-Q 3.1 %
 - 00-003-0801 (I) - Grossular, hydroxylan - Ca₃Al₂(SiO₄CO₃OH)₃ - I/Ic PDF 1. - S-
 - 01-071-0053 (C) - Pyrite - FeS₂ - I/Ic PDF 2.8 - S-Q 1.5 %
 - 01-087-2496 (C) - Clinocllore (Ilb-4) - Mg_{4.882}Fe_{0.22}Al_{1.881}Si_{2.96}O₁₀(OH)₈ - I/Ic
 - 00-019-0467 (D) - Ferropargasite, syn - NaCa₂Fe₄Al(Si₆Al₂)O₂₂(OH)₂ - I/Ic PDF 1.
 - 01-076-1849 (C) - Magnetite - Fe₃O₄ - I/Ic PDF 4.9 - S-Q 5.5 %
 - 01-072-1937 (C) - Calcite - CaCO₃ - I/Ic PDF 3.3 - S-Q 1.5 %

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PROJECT: 07-1118-0012 (4000)

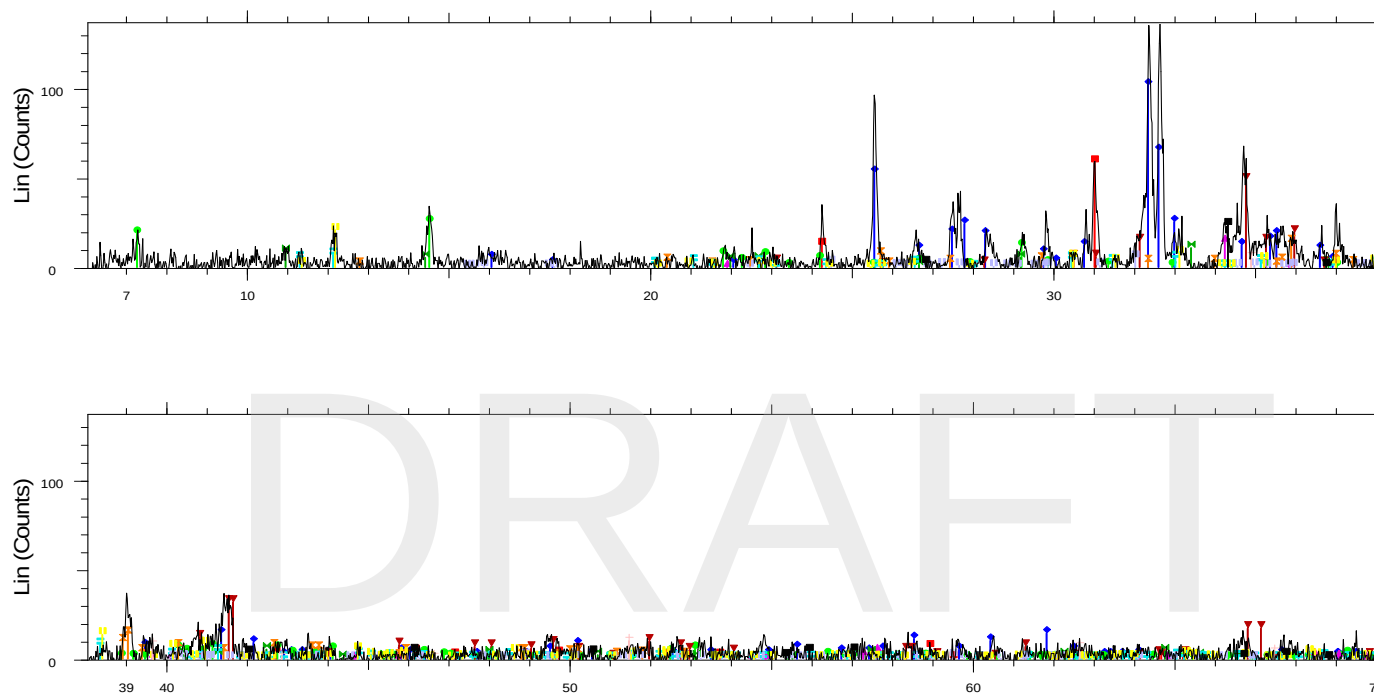


CHK: MRG/KJDF

XRD RESULTS FOR MAR07-33

FIGURE C4

MAR07-33



2-Theta - Scale

- MAR07-33 - File: Nov5019-4.raw - Type: 2Th/Th locked - Start: 6.000 ° - End: 70.00
- 01-079-1910 (C) - Quartz - SiO₂ - I/Ic PDF 3.1 - S-Q 6.9 %
 - 00-020-0548 (D) - Albite, calcian, ordered - (Na,Ca)(Si,Al)₄O₈ - I/Ic PDF 1. - S-Q 36.
 - 01-079-1270 (C) - Clinocllore - (Mg_{2.96}Fe_{1.55}Fe_{1.36}Al_{1.275})(Si_{2.622}Al_{1.376}O₁₀)(
 - 01-083-0984 (C) - Chalcopyrite - CuFeS₂ - I/Ic PDF 7.2 - S-Q 0.7 %
 - 00-019-0239 (D) - Diopside, syn - CaMg(SiO₃)₂ - I/Ic PDF 1. - S-Q 17.5 %
 - 00-017-0514 (D) - Epidote - Ca₂Al₂Fe(SiO₄)(Si₂O₇)(O,OH)₂ - I/Ic PDF 1. - S-Q 5.1 %
 - 00-002-0569 (D) - Talc Steatite Soapstone - 3MgO·4SiO₂·H₂O - I/Ic PDF 1. - S-Q 3.9
 - 01-073-0267 (C) - Tremolite - Ca₂Mg₅Si₈O₂₂(OH)₂ - I/Ic PDF 0.7 - S-Q 4.2 %
 - 00-019-0932 (I) - Microcline, intermediate - KAlSi₃O₈ - I/Ic PDF 1. - S-Q 1.9 %
 - 01-085-1424 (C) - Ferropargasite chlorous - NaCa₂(Fe,Mg)Al(Si₆Al₂)O₂₂(OH,Cl)₂ -
 - 00-002-1241 (D) - Pyrrhotite - FeS - I/Ic PDF 1. - S-Q 3.6 %
 - 01-072-1652 (C) - Calcite - CaCO₃ - I/Ic PDF 3.2 - S-Q 2.7 %

DATE: FEBRUARY 2008

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PROJECT: 07-1118-0012 (4000)

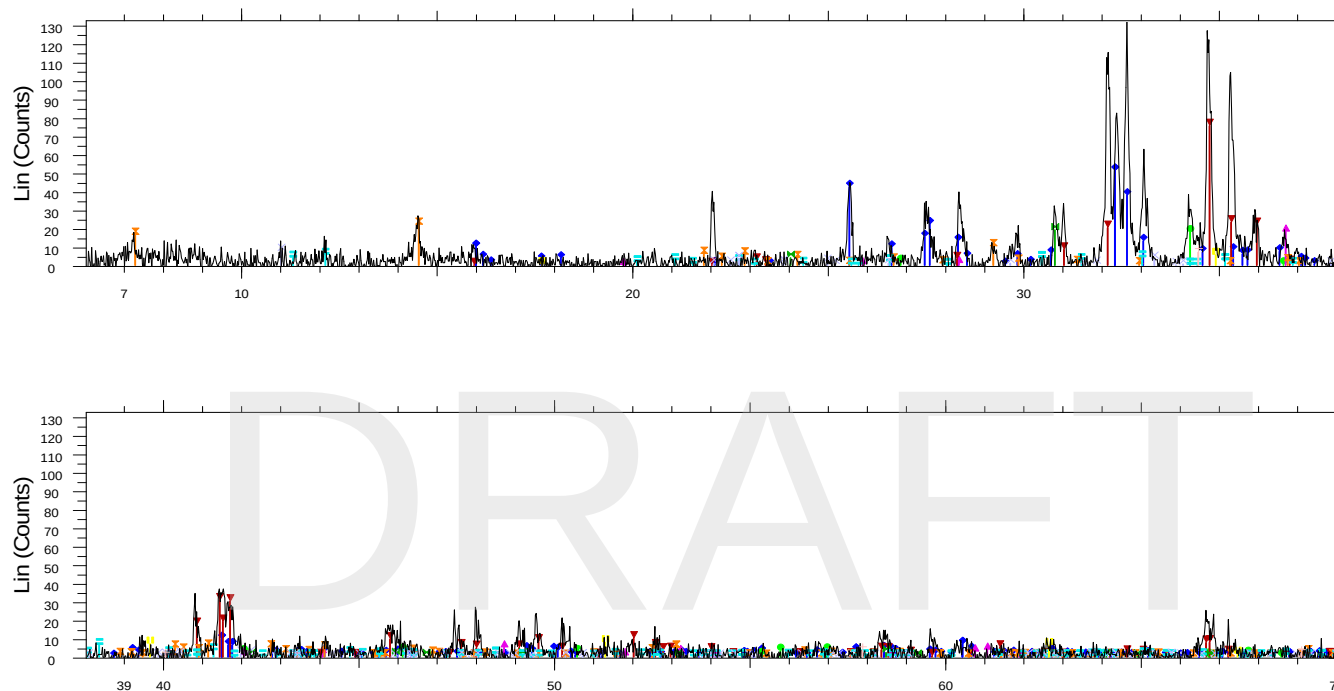


CHK: MRG/KJDF

XRD RESULTS FOR MAR07-49

FIGURE C5

MAR07-49



2-Theta - Scale

- MAR07-49 - File: Nov5019-5.raw - Type: 2Th/Th locked - Start: 6.000 ° - End: 70.00
- 01-071-1151 (C) - Albite high - $\text{Na}(\text{AlSi}_3\text{O}_8)$
 - 01-083-1762 (C) - Calcite - $\text{Ca}(\text{CO}_3)$
 - 01-079-1345 (C) - Dolomite - $\text{CaMg}(\text{CO}_3)_2$
 - 01-081-0487 (C) - Diopside - $(\text{Ca}_{0.959}\text{Ti}_{0.041})(\text{Mg}_{0.987}\text{Al}_{0.013})(\text{Si}_{1.905}\text{Al}_{0.095}\text{O}_6)$
 - 01-079-1270 (C) - Clinocllore - $(\text{Mg}_{2.96}\text{Fe}_{1.55}\text{Fe}_{1.36}\text{Al}_{1.275})(\text{Si}_{2.622}\text{Al}_{1.376}\text{O}_{10})$
 - 01-074-1811 (A) - Quartz alpha - SiO_2
 - 01-073-0267 (C) - Tremolite - $\text{Ca}_2\text{Mg}_5\text{Si}_8\text{O}_{22}(\text{OH})_2$
 - 01-073-0147 (C) - Talc - $\text{Mg}_3(\text{Si}_2\text{O}_5)_2(\text{OH})_2$
 - 00-017-0201 (D) - Pyrrhotite - Fe_{1-x}S
 - 01-075-0253 (C) - Chalcocopyrite - CuFeS_2

DATE: FEBRUARY 2008

CAD: _____

PROJECT: 07-1118-0012 (4000)

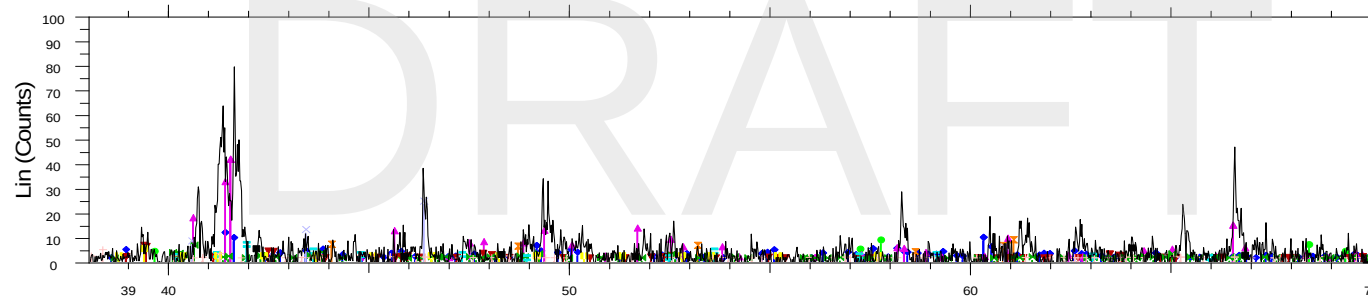
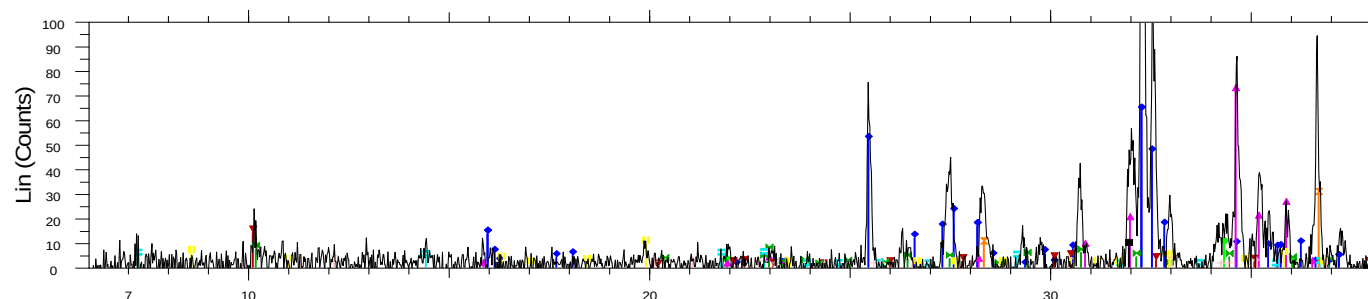


CHK: MRG/KJDF

XRD RESULTS FOR MAR07-80

FIGURE C6

MAR07-80



2-Theta - Scale

- MAR07-80 - File: Nov5019-6.raw - Type: 2Th/Th locked - Start: 6.000 ° - End: 70.00
 01-071-1152 (C) - Albite high - Na(AlSi3O8)
 00-025-0288 (D) - Chalcopyrite - CuFeS2
 01-071-1494 (C) - Diopside - CaMgSi2O6
 01-088-0709 (C) - Manganese biotite - (Mn,Mg,Al,Fe)1.8(K,Na,Ca)0.91(Si,Al,Ti)4O,
 01-086-0173 (C) - Rhodochrosite, syn - Mn(CO3)
 01-080-0743 (C) - Muscovite 2M1 - (K0.82Na0.18)(Fe0.03Al1.97)(AlSi3)O10(OH)2
 00-013-0003 (D) - Chlorite - Mg2Al3(Si3Al)O10(O)8
 00-041-1454 (I) - Zodacite - Ca4MnFe4(PO4)6(OH)4-12H2O
 00-027-0618 (N) - Schachnerite, syn - Ag1.1Hg0.9
 01-073-0267 (C) - Tremolite - Ca2Mg5Si8O22(OH)2
 01-076-0317 (A) - Rutile, syn - TiO2

DATE: FEBRUARY 2008

CAD: _____

PROJECT: 07-1118-0012 (4000)



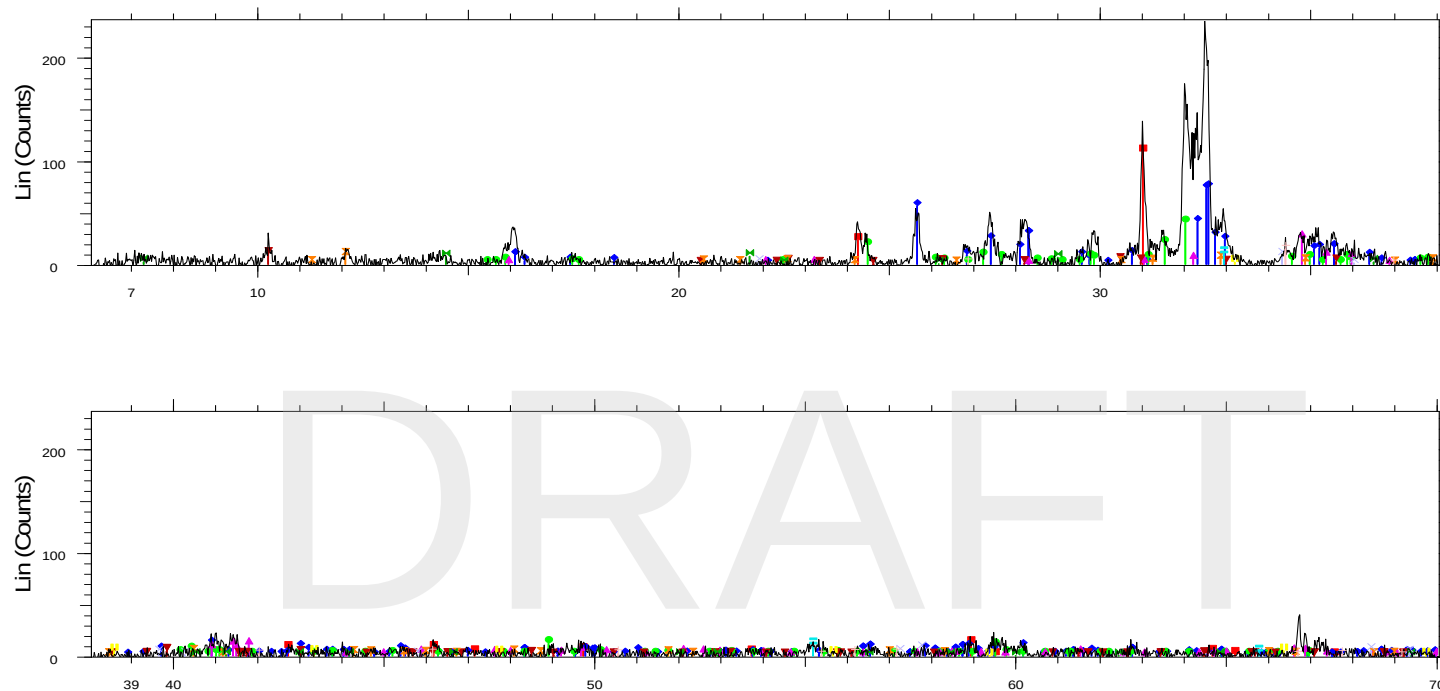
K: MRG/KJDF

N:\Active\2007\1118\07-1118-0012\Appendices\MAR07-80Fig16

XRD RESULTS FOR MAR07-92

FIGURE C7

MAR07-92



2-Theta - Scale

- MAR07-92 - File: Nov5019-7.raw - Type: 2Th/Th locked - Start: 6.000 ° - End: 70.00
 01-079-1910 (C) - Quartz - SiO₂
 01-076-0758 (C) - Albite low - Na_{1.09}(Al_{1.09}Si_{2.91}O₈)
 00-019-0932 (I) - Microcline, intermediate - KAlSi₃O₈
 01-074-2424 (C) - Diopside ferrous - Ca_{0.92}Fe_{0.08}Al_{1.14}Fe_{0.33}Mg_{0.53}Si₂O₆
 01-080-1110 (C) - Biotite - KFeMg₂(AlSi₃O₁₀)(OH)₂
 00-020-0378 (N) - Hastingsite, chlorian, potassian - (K,Na)Ca₂(Fe,Mg)₅(Si,Al)₈O₂₂
 00-012-0185 (D) - Clinocllore - (Mg,Fe,Al)₆(Si,Cr)₄O₁₀(OH)₈
 00-004-0864 (D) - Fluorite, syn - CaF₂
 00-025-0288 (D) - Chalcopyrite - CuFeS₂
 01-071-2219 (C) - Pyrite - FeS₂
 01-072-1650 (C) - Calcite - CaCO₃

DATE: FEBRUARY 2008

CAD: _____

PROJECT: 07-1118-0012 (4000)

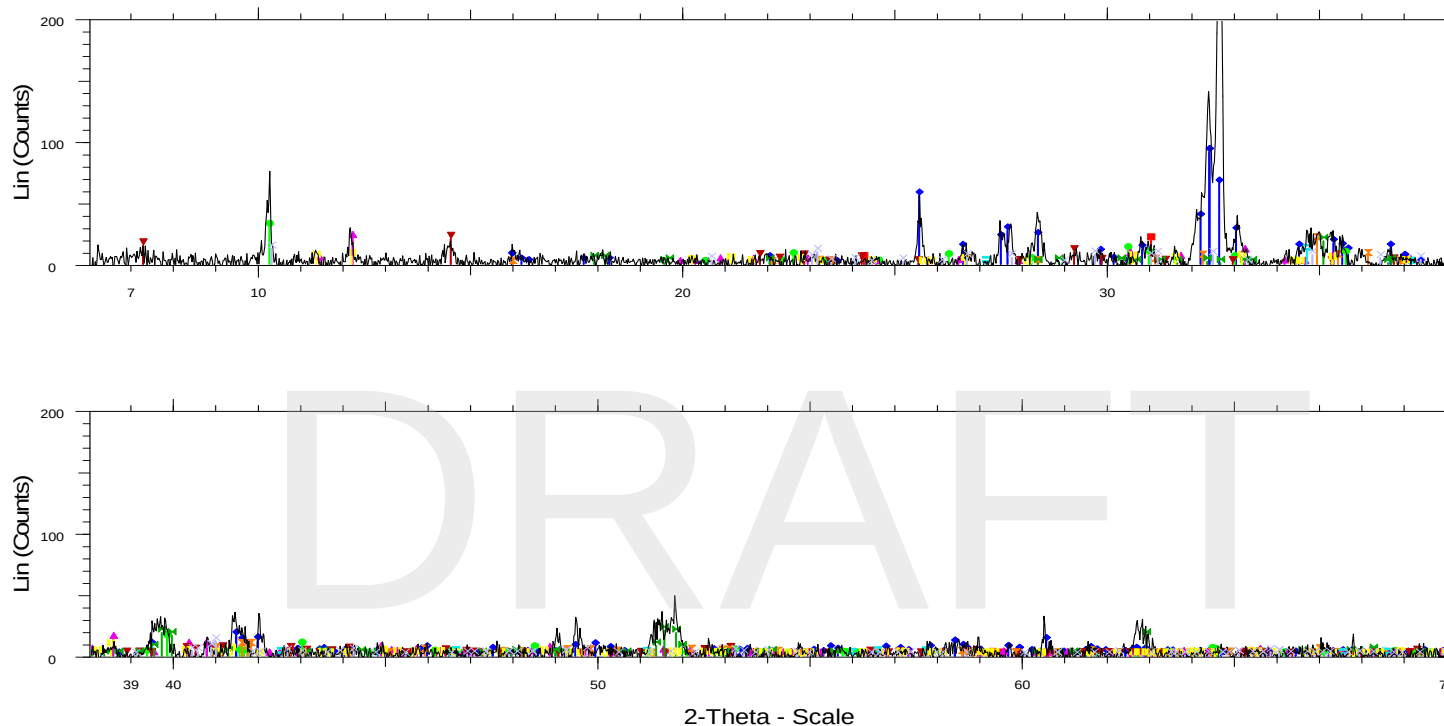


CHK: MRG/KJDF

XRD RESULTS FOR MAR07-96

FIGURE C8

MAR07-96



MAR07-96 - File: Nov5019-8.raw - Type: 2Th/Th locked - Start: 6.000 ° - End: 70.00
 01-079-1910 (C) - Quartz - SiO₂
 01-083-1938 (C) - Andesine - Na_{0.622}Ca_{0.368}Al_{1.29}Si_{2.71}O₈
 01-080-1110 (C) - Biotite - KFeMg₂(AlSi₃O₁₀)(OH)₂
 01-083-2055 (C) - Hastingsite - Na_{1.52}K_{0.64}Ca_{1.74}(Mg_{1.17}Fe_{2.96}Ti_{0.39}Al_{0.58})Si₅
 01-079-1270 (C) - Clinocllore - (Mg_{2.96}Fe_{1.55}Fe_{1.36}Al_{1.275})(Si_{2.622}Al_{1.376}O₁₀)(OH)₂
 01-075-1577 (C) - Diopside - CaMg(SiO₃)₂
 00-017-0200 (D) - Pyrrhotite 4C - FeS
 01-086-2336 (C) - Calcite magnesian - (Mg_{1.29}Ca_{0.871})(CO₃)
 01-073-0266 (C) - Tremolite - Ca₂Mg₅Si₈O₂₂(OH)₂
 01-080-0742 (C) - Muscovite 2M1 - (K_{0.82}Na_{0.18})(Fe_{0.03}Al_{1.97})(AlSi₃)O₁₀(OH)₂

DATE: FEBRUARY 2008

CAD: _____

PROJECT: 07-1118-0012 (4000)

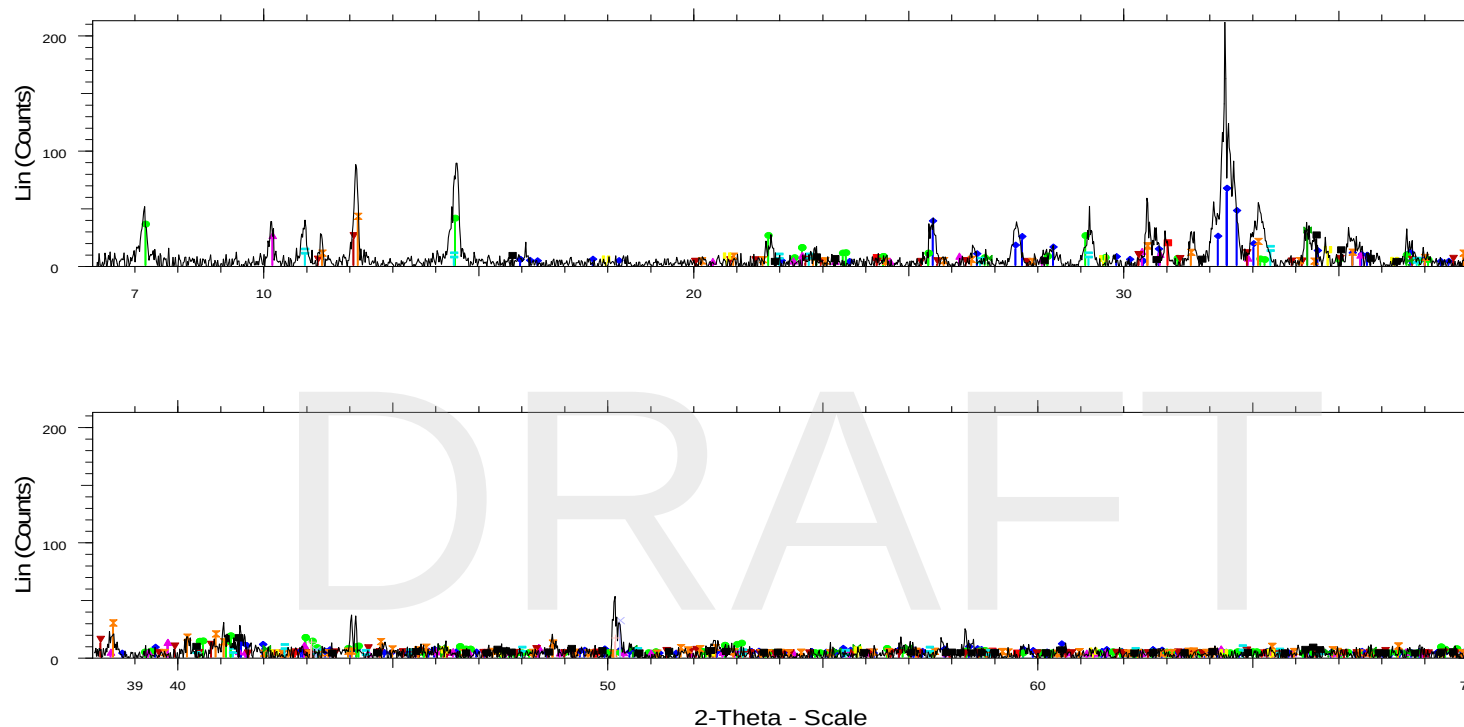


CHK: MRG/KJDF

XRD RESULTS FOR MAR07-98

FIGURE C9

MAR07-98



- 2-Theta - Scale
- MAR07-98 - File: Nov5019-9.raw - Type: 2Th/Th locked - Start: 6.000 ° - End: 70.00
 - 01-079-1910 (C) - Quartz - SiO₂
 - 01-083-1939 (C) - Andesine - Na_{0.685}Ca_{0.347}Al_{1.46}Si_{2.54}O₈
 - 01-080-1119 (C) - Clinocllore - Mg_{4.54}Al_{0.97}Fe_{0.46}Mn_{0.03}(Si_{2.85}Al_{1.15}O₁₀)(OH)₈
 - 01-080-1108 (C) - Biotite - KFeMg₂(AlSi₃O₁₀)(OH)₂
 - 01-084-2121 (C) - Hastingsite - Na_{3.96}Ca₂Mg_{0.55}Fe_{4.45}Al_{1.68}Si_{6.32}O₂₃(OH)
 - 01-085-1423 (C) - Ferropargasite - NaCa₂(Fe,Mg)₄Al(Si₆Al₂)O₂₂(OH)₂
 - 01-086-2334 (C) - Calcite - Ca(CO₃)
 - 00-002-0569 (D) - Talc Steatite Soapstone - 3MgO·4SiO₂·H₂O
 - 01-071-1776 (C) - Alunite - K(Al₃(SO₄)₂(OH)₆)
 - 00-004-0829 (D) - Periclase, syn - MgO
 - 01-087-0630 (C) - Osbornite, syn - (TiN)_{0.88}
 - 01-071-1796 (C) - Diopside - CaMgSi₂O₆

DATE: FEBRUARY 2008

CAD: _____

PROJECT: 07-1118-0012 (4000)

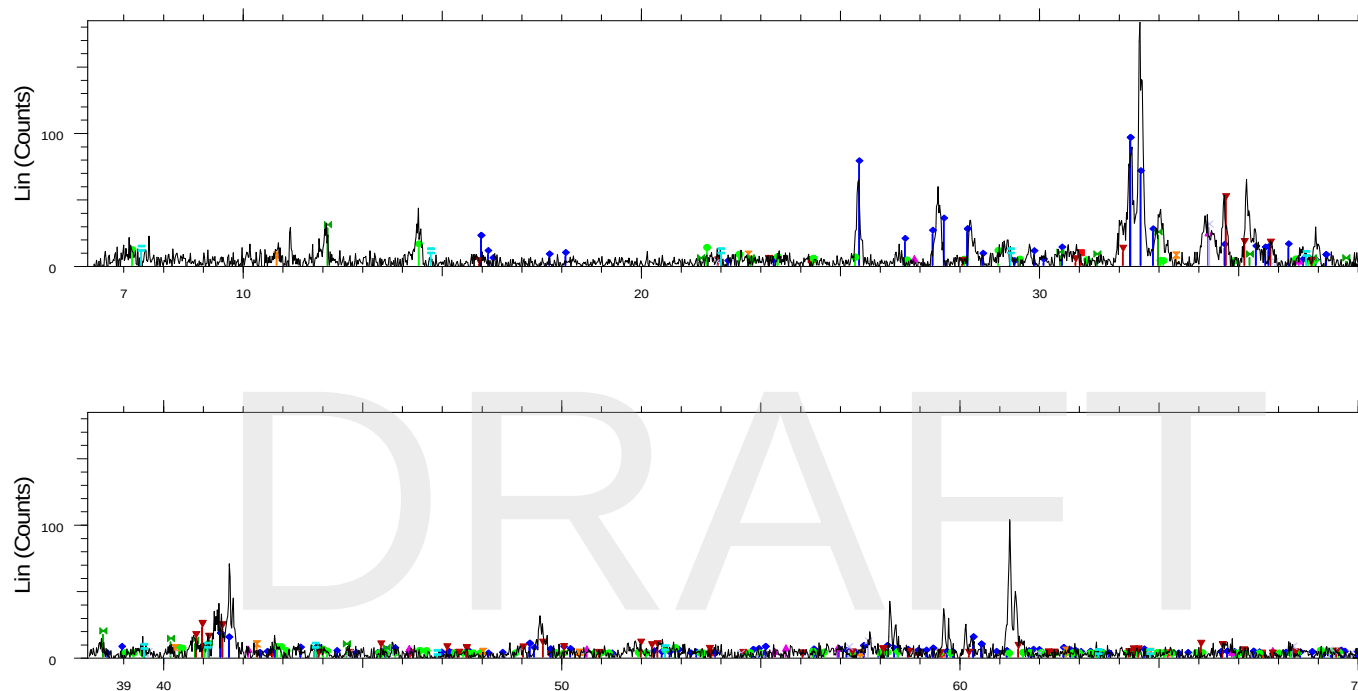


CHK: MRG/KJDF

XRD RESULTS FOR MAR07-99

FIGURE C10

MAR07-99



2-Theta - Scale

- MAR07-99 - File: Nov5019-10.raw - Type: 2Th/Th locked - Start: 6.000 ° - End: 70.0
 01-079-1910 (C) - Quartz - SiO₂
 01-071-1152 (C) - Albite high - Na(AlSi₃O₈)
 01-082-0038 (C) - Clinocllore IIb-4 (Cr-, Mg-rich) - (Mg_{0.99}Al_{0.01})₅(Al_{0.67}Fe_{0.33})₂(OH)₂
 01-086-2339 (C) - Calcite - Ca(CO₃)
 00-003-0887 (D) - Talc - Mg₃(Si₄O₁₀)(OH)₂·3MgO·4SiO₂·H₂O
 00-026-1372 (I) - Ferropargasite, syn - NaCa₂Fe₄Al₆Si₆Al₂O₂₂(OH)₂
 01-072-1379 (C) - Diopside - (Mg,Fe₂Al₂)Ca(Si_{1.5}Al_{0.5})O₆
 01-083-0983 (C) - Chalcopyrite - CuFeS₂
 00-002-0028 (D) - Chlorite - (Mg,Fe)₅(Al,Si)₅O₁₀(OH)₈

DATE: FEBRUARY 2008

CAD: _____

PROJECT: 07-1118-0012 (4000)



CHK: MRG/KJDF

XRD RESULTS FOR THE COMBINED TAILINGS AVERAGE GRADE ORE

FIGURE C11

Combined Tailings Average Grade Ore



2-Theta - Scale

Combined Tailings Average Grade Ore - File: NOV5019-11.raw - Type: 2Th/Th lock	01-073-2339 (C) - Actinolite - $\text{Na}_{0.08}\text{Ca}_{1.76}\text{Mn}_{0.16}\text{Mg}_{1.88}\text{Fe}_{2.72}\text{Fe}_{0.32}\text{Al}_{3.2}\text{Si}_{7.68}\text{O}_{22}$
01-079-1910 (C) - Quartz - SiO_2	01-088-1216 (C) - Cummingtonite - $(\text{Ca}_{0.076}\text{Mg}_{3.445}\text{Fe}_{3.471})(\text{Si}_{7.983}\text{Al}_{0.018})\text{O}_{22}$
01-083-1938 (C) - Andesine - $\text{Na}_{0.622}\text{Ca}_{0.368}\text{Al}_{1.29}\text{Si}_{2.71}\text{O}_8$	01-074-1036 (C) - Talc - $\text{Mg}_3\text{Si}_4\text{O}_{10}(\text{OH})_2$
01-082-0460 (C) - Diopside - $\text{Ca}_{0.970}\text{Co}_{0.030}(\text{Mg}_{0.831}\text{Co}_{0.169})(\text{Si}_2\text{O}_6)$	
01-087-2496 (C) - Clinocllore (lib-4) - $\text{Mg}_{4.882}\text{Fe}_{0.22}\text{Al}_{1.881}\text{Si}_{2.960}\text{O}_{10}(\text{OH})_8$	
01-080-1110 (C) - Biotite - $\text{KFeMg}_2(\text{AlSi}_3\text{O}_{10})(\text{OH})_2$	
00-003-0015 (D) - Montmorillonite (bentonite) - $(\text{Na,Ca})_{0.3}(\text{Al,Mg})_2\text{Si}_4\text{O}_{10}(\text{OH})_2 \cdot x\text{H}_2\text{O}$	
01-085-1436 (C) - Magnetite - Fe_3O_4	

DATE: FEBRUARY 2008

CAD: _____

PROJECT: 07-1118-0012 (4000)

CHK: MRG/KJDF



APPENDIX D
STATIC TESTING DATA

TABLE D1
STATISTICAL SUMMARY OF ACID-BASE ACCOUNTING ANALYSIS
MARATHON PGM-Cu PROJECT

Sample ID	Paste pH	Solid-phase Chemistry					AP (t CaCO ₃ /1000 t)	Neutralization Potentials		Net Potential Ratios	
		Total Sulphur (wt% as S)	Sulphide (wt% as S)	Sulphate (wt% as SO ₄)	Total Carbon (wt% as C)	Carbonate (wt% as CO ₃)		NP (t CaCO ₃ /1000 t)	CaNP (t CaCO ₃ /1000 t)	NP:AP	CaNP:AP
EASTERN GABBRO (n = 57)											
MAR07-01	9.85	0.076	0.080	0.40	0.026	0.039	2.40	31.40	0.650	13.10	0.271
MAR07-03	9.80	0.142	0.100	0.40	0.105	0.231	3.10	27.70	3.853	9.04	1.243
MAR07-04	9.88	0.030	0.030	0.40	0.160	0.366	0.94	25.50	6.104	27.10	6.494
MAR07-05	9.93	0.005	0.010	0.40	0.130	0.258	0.31	14.50	4.303	46.60	13.881
MAR07-06	9.90	0.017	0.010	0.40	0.218	0.546	0.31	25.00	9.107	80.60	29.376
MAR07-07	9.96	0.009	0.010	0.40	0.043	0.132	0.31	14.10	2.202	45.60	7.102
MAR07-08	9.00	0.006	0.010	0.40	0.041	0.005	0.31	42.90	0.083	139.00	0.269
MAR07-101	9.76	1.270	1.160	0.40	0.089	0.131	36.30	15.50	2.185	0.43	0.060
MAR07-112	9.67	0.028	0.010	0.40	0.028	0.075	0.31	9.70	1.251	31.10	4.035
MAR07-113	9.62	0.443	0.150	0.40	0.053	0.145	4.70	46.80	2.418	9.98	0.515
MAR07-114	9.91	0.110	0.010	0.40	0.150	0.449	0.31	40.40	7.489	130.00	24.157
MAR07-12	9.93	0.005	0.010	0.40	0.012	0.005	0.31	44.90	0.083	145.00	0.269
MAR07-16	9.25	4.370	4.020	0.40	0.121	0.161	126.00	18.20	2.685	0.15	0.021
MAR07-18	9.78	0.193	0.090	0.40	0.207	0.539	2.80	38.40	8.990	13.50	3.211
MAR07-23	9.53	0.101	0.060	0.40	0.092	0.214	1.90	30.90	3.569	16.30	1.879
MAR07-24	9.79	0.016	0.010	0.40	0.079	0.201	0.31	21.10	3.352	68.10	10.814
MAR07-25	9.72	0.146	0.090	0.40	0.038	0.045	2.90	22.30	0.751	7.69	0.259
MAR07-27	9.20	0.820	0.540	0.40	0.085	0.169	17.00	21.60	2.819	1.27	0.166
MAR07-32	9.25	0.126	0.050	0.40	0.409	1.100	1.60	43.10	18.347	26.90	11.467
MAR07-36	9.61	0.186	0.080	0.40	0.086	0.119	2.50	23.70	1.985	9.50	0.794
MAR07-37	9.60	0.011	0.010	0.40	0.224	0.391	0.31	13.70	6.521	44.30	21.037
MAR07-38	9.83	0.034	0.010	0.40	0.200	0.381	0.31	34.00	6.355	110.00	20.499
MAR07-39	9.79	0.036	0.010	0.40	0.171	0.330	0.31	30.70	5.504	99.00	17.755
MAR07-42	9.73	0.020	0.020	0.40	0.162	0.249	0.62	40.20	4.153	64.80	6.698
MAR07-43	9.78	0.028	0.020	0.40	0.236	0.800	0.62	30.30	13.343	48.90	21.521
MAR07-44	9.88	0.009	0.010	0.40	0.103	0.151	0.31	13.40	2.519	43.20	8.124
MAR07-45	9.92	0.042	0.020	0.40	0.242	0.554	0.62	26.30	9.240	42.40	14.903
MAR07-46	9.86	0.079	0.040	0.40	0.200	0.517	1.20	33.20	8.623	27.70	7.186
MAR07-48	9.81	0.051	0.020	0.40	0.190	0.328	0.62	27.80	5.471	44.80	8.824
MAR07-50	9.56	0.024	0.020	0.40	0.020	0.005	0.62	33.20	0.083	53.50	0.135
MAR07-51	9.26	0.014	0.010	0.40	0.068	0.100	0.31	27.50	1.668	88.00	5.380
MAR07-53	9.87	0.019	0.010	0.40	0.040	0.046	0.31	19.30	0.767	62.10	2.475
MAR07-57	10.06	0.005	0.010	0.40	0.032	0.049	0.31	26.50	0.817	85.40	2.636
MAR07-60	9.96	0.014	0.010	0.40	0.045	0.071	0.31	36.50	1.184	118.00	3.820
MAR07-61	10.07	0.008	0.010	0.40	0.044	0.053	0.31	34.10	0.884	110.00	2.852
MAR07-62	10.03	0.006	0.010	0.40	0.060	0.055	0.31	60.10	0.917	194.00	2.959
MAR07-70	10.22	0.036	0.010	0.40	0.049	0.237	0.31	49.60	3.953	160.00	12.751
MAR07-71	9.89	0.059	0.010	0.40	0.066	0.221	0.31	21.60	3.686	69.60	11.890
MAR07-72	9.82	0.077	0.020	0.40	0.252	0.761	0.62	32.00	12.693	51.70	20.472
MAR07-78	10.09	0.005	0.010	0.40	0.020	0.024	0.31	6.00	0.400	19.40	1.291
MAR07-82	9.75	0.106	0.030	0.40	0.151	0.330	0.94	42.80	5.504	45.50	5.855
MAR07-83	10.08	0.005	0.010	0.40	0.073	0.104	0.31	39.40	1.735	127.00	5.595
MAR07-85	9.97	0.005	0.010	0.40	0.061	0.051	0.31	44.30	0.851	143.00	2.744
MAR07-87	9.86	0.006	0.010	0.40	0.083	0.061	0.31	46.60	1.017	150.00	3.282
MAR07-89	9.87	0.225	0.110	0.40	0.153	0.211	3.40	40.70	3.519	11.80	1.035
MAR07-91	9.65	0.195	0.090	0.40	0.109	0.193	2.70	40.10	3.219	14.70	1.192
MAR07-95	9.98	0.005	0.010	0.40	0.050	0.113	0.31	8.80	1.885	28.50	6.080
MAR07-97	9.88	0.017	0.010	0.40	0.180	0.497	0.31	65.40	8.289	211.00	26.740
MAR07-99	9.72	0.519	0.360	0.40	0.292	0.760	11.30	39.60	12.676	3.50	1.122
MAR07-10	8.86	0.006	0.010	0.40	0.034	0.005	0.31	44.10	0.083	142.00	0.269
MAR07-55	9.83	0.018	0.010	0.40	0.056	0.082	0.31	20.70	1.368	66.80	4.412
MAR07-56	9.98	0.019	0.010	0.40	0.037	0.048	0.31	34.50	0.801	111.00	2.583

Sample ID	Paste pH	Solid-phase Chemistry					AP (t CaCO ₃ /1000 t)	Neutralization Potentials		Net Potential Ratios	
		Total Sulphur (wt% as S)	Sulphide (wt% as S)	Sulphate (wt% as SO ₄)	Total Carbon (wt% as C)	Carbonate (wt% as CO ₃)		NP (t CaCO ₃ /1000 t)	CaNP (t CaCO ₃ /1000 t)	NP:AP	CaNP:AP
MAR07-59	9.81	0.017	0.010	0.40	0.047	0.045	0.31	71.10	0.751	229.00	2.421
MAR07-65	9.57	0.080	0.010	0.40	0.076	0.051	0.31	120.00	0.851	387.00	2.744
MAR07-54	9.87	0.031	0.010	0.40	0.039	0.080	0.31	18.40	1.334	59.30	4.304
MAR07-58	10.01	0.058	0.010	0.40	0.064	0.059	0.31	35.80	0.984	115.00	3.174
MAR07-64	9.95	0.275	0.120	0.40	0.131	0.345	3.80	35.50	5.754	9.32	1.514
MIN	8.86	0.01	0.01	<0.4	0.01	0.01	0.3	6	0.08	0.2	0.02
MAX	10.22	4	4	<0.4	0.4	1	126	120	18	387	29
AVG	9.54	0.2	0.1	<0.4	0.1	0.2	4	33	4	74	7
MED	9.81	0.03	0.01	<0.4	0.08	0.2	0.3	32	3	52	3
STDEV	0.27	0.6	0.6	–	0.08	0.2	17	18	4	71	8
TWO DUCK LAKE GABBRO (n = 32)											
MAR07-09	9.97	0.018	0.010	0.40	0.051	0.046	0.31	48.40	0.767	156.00	2.475
MAR07-106	9.92	0.069	0.010	0.40	0.246	1.050	0.31	0.38	17.513	1.22	56.493
MAR07-107	9.81	0.754	0.550	0.40	0.032	0.041	17.20	63.80	0.684	3.70	0.040
MAR07-108	9.39	0.235	0.050	0.40	0.373	1.450	1.60	44.60	24.184	27.90	15.115
MAR07-109	9.56	0.024	0.010	0.40	0.508	2.160	0.31	53.20	36.026	172.00	116.214
MAR07-11	10.05	0.006	0.010	0.40	0.008	0.005	0.31	21.30	0.083	68.80	0.269
MAR07-14	9.88	0.017	0.010	0.40	0.518	1.830	0.31	45.10	30.522	144.00	98.459
MAR07-15	9.12	3.730	3.520	0.40	0.234	0.862	110.00	25.90	14.377	0.24	0.131
MAR07-19	9.67	0.234	0.100	0.40	0.175	0.429	3.20	59.90	7.155	18.80	2.236
MAR07-21	9.81	0.170	0.070	0.40	0.182	0.523	2.10	41.20	8.723	19.40	4.154
MAR07-22	9.24	0.063	0.020	0.40	0.246	0.686	0.62	39.00	11.442	62.80	18.454
MAR07-28	9.71	0.035	0.020	0.40	0.026	0.027	0.62	44.70	0.450	72.10	0.726
MAR07-29	9.83	0.027	0.010	0.40	0.074	0.171	0.31	30.80	2.852	99.50	9.200
MAR07-30	9.66	0.005	0.010	0.40	0.201	0.479	0.31	44.60	7.989	144.00	25.772
MAR07-31	9.62	0.027	0.010	0.40	0.349	1.370	0.31	42.70	22.850	138.00	73.710
MAR07-41	9.83	0.008	0.020	0.40	0.150	0.373	0.62	25.90	6.221	41.50	10.034
MAR07-47	9.75	0.047	0.010	0.40	0.166	0.251	0.31	41.10	4.186	132.58	13.505
MAR07-67	9.94	0.054	0.020	0.40	0.129	0.414	0.62	31.00	6.905	50.00	11.137
MAR07-68	9.94	0.086	0.020	0.40	0.079	0.211	0.62	27.70	3.519	44.40	5.676
MAR07-69	9.86	0.005	0.010	0.40	0.425	1.710	0.31	49.00	28.521	158.00	92.003
MAR07-76	9.88	0.262	0.120	0.40	0.036	0.079	3.90	20.10	1.318	5.15	0.338
MAR07-77	9.63	0.116	0.050	0.40	0.155	0.541	1.60	34.80	9.023	21.70	5.640
MAR07-79	9.72	0.275	0.140	0.40	0.098	0.305	4.40	59.30	5.087	13.60	1.156
MAR07-80	9.66	0.345	0.190	0.40	0.093	0.236	6.00	47.30	3.936	7.89	0.656
MAR07-84	9.95	0.011	0.010	0.40	0.062	0.102	0.31	34.20	1.701	110.00	5.488
MAR07-86	9.72	0.008	0.010	0.40	0.058	0.147	0.31	30.90	2.452	99.60	7.909
MAR07-88	9.82	0.009	0.010	0.40	0.090	0.232	0.31	27.90	3.870	89.90	12.482
MAR07-90	9.92	0.047	0.010	0.40	0.171	0.472	0.31	28.20	7.872	90.90	25.395
MAR07-93	9.81	0.090	0.050	0.40	0.254	0.873	1.60	40.20	14.561	25.20	9.100
MAR07-94	9.90	0.009	0.010	0.40	0.250	0.995	0.31	29.90	16.595	96.50	53.534
MAR07-98	9.74	0.011	0.010	0.40	0.503	2.080	0.31	51.00	34.692	164.00	111.910
MAR07-63	9.87	0.472	0.250	0.40	0.472	1.540	7.90	38.80	25.685	4.91	3.251
MIN	9.12	0.01	0.01	<0.4	0.01	0.01	0.3	0	0.08	0	0.04
MAX	10.05	4	4	<0.4	0.5	2	110	64	36	172	116
AVG	9.70	0.2	0.2	<0.4	0.2	0.7	5	38	11	71	25
MED	9.81	0.05	0.01	<0.4	0.2	0.5	0.5	40	8	66	9
STDEV	0.20	0.7	0.6	–	0.2	0.6	19	13	11	57	35
VOLCANICS (n = 10)											
MAR07-102	9.75	0.135	0.010	0.40	0.049	0.069	0.31	17.40	1.151	55.60	3.712
MAR07-105	10.08	0.082	0.010	0.40	0.144	0.513	0.31	20.80	8.556	67.10	27.601
MAR07-111	9.27	0.159	0.030	0.40	0.084	0.304	0.94	19.80	5.070	21.10	5.394
MAR07-110	8.94	9.680	9.670	0.40	0.081	0.111	302.00	24.80	1.851	0.08	0.006

Sample ID	Paste pH	Solid-phase Chemistry					AP (t CaCO ₃ /1000 t)	Neutralization Potentials		Net Potential Ratios	
		Total Sulphur (wt% as S)	Sulphide (wt% as S)	Sulphate (wt% as SO ₄)	Total Carbon (wt% as C)	Carbonate (wt% as CO ₃)		NP (t CaCO ₃ /1000 t)	CaNP (t CaCO ₃ /1000 t)	NP:AP	CaNP:AP
MAR07-17	9.54	0.341	0.210	0.40	0.299	0.990	6.60	32.80	16.512	4.98	2.502
MAR07-34	9.85	0.012	0.010	0.40	0.047	0.087	0.31	11.40	1.451	36.80	4.681
MAR07-52	9.73	0.013	0.010	0.40	0.126	0.370	0.31	22.90	6.171	73.90	19.907
MAR07-66	9.09	1.060	0.820	0.40	0.087	0.109	25.60	19.40	1.818	0.76	0.071
MAR07-96	9.48	6.710	6.340	0.40	0.107	0.117	198.00	19.90	1.951	0.10	0.010
MAR07-33	9.00	1.990	1.630	0.40	0.288	0.357	51.00	36.10	5.954	0.71	0.117
MIN	8.94	0.01	0.01	<0.4	0.05	0.07	0.3	11	1	0.08	0.01
MAX	10.08	10	10	<0.4	0.3	1	302	36	17	74	28
AVG	9.33	2	2	<0.4	0.1	0.3	59	23	5	26	6
MED	9.51	0.2	0.1	<0.4	0.1	0.2	4	20	4	13	3
STDEV	0.39	3	3	–	0.09	0.3	105	7	5	30	10
HETEROLITHIC BRECCIA (n = 6)											
MAR07-02	9.75	0.058	0.040	0.40	0.249	0.879	1.10	29.40	14.661	26.20	13.328
MAR07-100	9.54	0.853	0.660	0.40	0.103	0.197	20.60	17.30	3.286	0.84	0.160
MAR07-35	9.82	0.041	0.010	0.40	0.204	0.446	0.31	34.70	7.439	112.00	23.996
MAR07-49	9.52	0.986	0.710	0.40	0.176	0.285	22.10	28.40	4.753	1.28	0.215
MAR07-74	10.15	0.007	0.010	0.40	0.189	0.620	0.31	75.60	10.341	244.00	33.358
MAR07-81	9.70	0.323	0.180	0.40	0.148	0.470	5.60	56.20	7.839	9.99	1.400
MIN	9.52	0.01	0.01	<0.4	0.1	0.2	0.3	17	3	0.8	0.2
MAX	10.15	1	0.7	<0.4	0.2	0.9	22	76	15	244	33
AVG	9.70	0.4	0.3	<0.4	0.2	0.5	8	40	8	66	12
MED	9.72	0.2	0.1	<0.4	0.2	0.5	3	32	8	18	7
STDEV	0.23	0.4	0.3	–	0.05	0.2	10	22	4	97	14
SYENITE (n = 7)											
MAR07-13	9.46	0.129	0.090	0.40	0.427	1.120	2.80	33.20	12.709	11.70	6.672
MAR07-20	9.26	0.099	0.030	0.40	0.402	1.230	0.94	38.20	35.641	40.70	21.825
MAR07-26	9.60	0.022	0.010	0.40	0.579	0.819	0.31	26.30	155.656	84.70	44.065
MAR07-40	9.51	0.005	0.010	0.40	0.431	1.630	0.31	41.50	115.868	134.00	87.699
MAR07-73	9.19	0.026	0.010	0.40	0.433	1.520	0.31	36.50	116.406	118.00	81.780
MAR07-75	9.23	0.369	0.140	0.40	0.858	2.900	4.50	65.60	15.890	14.60	10.749
MAR07-92	9.44	0.005	0.010	0.40	0.183	0.647	0.31	19.50	49.197	63.00	34.810
MIN	9.19	0.01	0.01	<0.4	0.2	0.6	0.3	20	13	12	7
MAX	9.60	0.4	0.1	<0.4	0.9	3	5	66	156	134	88
AVG	9.36	0.09	0.04	<0.4	0.5	1	1	37	72	67	41
MED	9.44	0.03	0.01	<0.4	0.4	1	0.3	37	49	63	35
STDEV	0.16	0.1	0.05	–	0.2	0.7	2	15	57	48	33
SERPENTINITE (n = 2)											
MAR07-103	9.86	0.228	0.090	0.40	0.197	0.632	2.80	48.00	10.541	17.20	3.765
MAR07-104	9.95	0.115	0.010	0.40	0.473	1.750	0.31	71.30	29.188	230.00	94.155
MIN	9.86	0.1	0.01	<0.4	0.2	0.6	0.3	48	11	17	4
MAX	9.95	0.2	0.09	<0.4	0.5	2	3	71	29	230	94
AVG	9.90	0.2	0.05	<0.4	0.3	1	2	60	20	124	49
MED	9.90	0.2	0.05	<0.4	0.3	1	2	60	20	124	49
STDEV	0.06	0.08	0.06	–	0.2	0.8	2	16	13	150	64
TAILINGS -COMBINED (n = 1)											
Average Grade Ore	8.82	0.181	0.100	< 0.4	0.105	0.319	3.1	24.0	5.321	7.7	

TABLE D2
RESULTS OF WHOLE ROCK ANALYSIS
MARATHON PGM-Cu PROJECT

SAMPLE ID	WHOLE ROCK ANALYSIS													
	SiO ₂ (%)	Al ₂ O ₃ (%)	Fe ₂ O ₃ (%)	MgO (%)	CaO (%)	Na ₂ O (%)	K ₂ O (%)	TiO ₂ (%)	P ₂ O ₅ (%)	MnO (%)	Cr ₂ O ₃ (%)	V ₂ O ₅ (%)	LOI (%)	Sum (%)
EASTERN GABBRO (n = 57)														
MAR07-01	42.4	11.6	22.3	11.6	8.0	2.2	0.4	2	0.2	0.3	0.05	0.1	-0.4	100
MAR07-04	45.7	14.2	16.2	7.7	11.2	2.6	0.5	1	0.2	0.2	0.07	0.09	0.4	101
MAR07-05	50.7	15.4	12.4	6.7	11.0	3.0	0.5	1	0.06	0.2	0.03	0.05	0.4	102
MAR07-07	50.3	15.8	11.6	7.2	11.1	2.9	0.3	2	0.08	0.2	0.08	0.05	-0.09	101
MAR07-08	35.0	10.6	33.6	12.9	4.3	1.7	0.2	3	0.1	0.4	0.02	0.3	-1	101
MAR07-10	38.7	8.8	27.7	17.0	4.7	1.4	0.2	1	0.1	0.4	0.03	0.08	-0.5	100
MAR07-101	50.7	16.7	10.7	5.6	8.8	3.9	0.8	0.4	0.2	0.2	0.05	0.03	2	100
MAR07-112	50.3	14.9	14.5	6.3	10.0	2.8	0.7	1	0.2	0.2	0.02	0.06	-0.5	101
MAR07-12	45.8	15.1	16.2	12.1	7.1	2.7	0.7	0.3	0.2	0.3	0.01	0.01	-0.5	100
MAR07-16	52.1	13.7	13.5	3.9	8.9	3.3	0.8	0.6	0.3	0.2	0.02	0.02	2	100
MAR07-18	39.0	10.5	22.8	4.9	11.6	2.5	0.9	4	3	0.3	0.09	0.08	0.5	99
MAR07-27	52.8	17.8	8.9	5.7	8.9	4.1	0.3	0.4	0.2	0.2	0.05	0.02	2	101
MAR07-32	55.0	17.5	7.6	2.4	8.1	4.5	2	0.6	0.3	0.1	0.04	0.03	3	101
MAR07-37	47.0	14.2	15.9	6.3	11.6	2.6	0.3	2	0.05	0.2	0.03	0.09	0.8	101
MAR07-38	45.9	15.3	16.1	7.9	10.2	2.8	0.5	1	0.2	0.2	0.08	0.08	0.4	101
MAR07-39	45.2	14.1	18.0	8.6	9.2	2.7	0.4	1	0.2	0.2	0.04	0.08	0.6	101
MAR07-42	45.6	12.1	17.4	11.9	11.1	1.8	0.3	0.9	0.2	0.3	0.1	0.06	-0.2	102
MAR07-43	49.0	14.6	13.9	7.7	9.8	2.7	0.7	0.8	0.4	0.2	0.04	0.05	1	101
MAR07-44	47.3	15.3	14.3	8.4	11.3	2.7	0.4	0.9	0.3	0.2	0.04	0.06	-0.1	101
MAR07-46	45.8	13.1	16.3	10.5	10.5	2.4	0.5	0.8	0.4	0.3	0.05	0.05	0.4	101
MAR07-51	42.5	7.7	19.9	15.4	9.8	1.3	0.3	1	0.5	0.3	0.1	0.05	2	102
MAR07-53	48.6	14.5	12.3	7.9	13.0	2.5	0.3	0.9	0.2	0.2	0.04	0.06	0.8	101
MAR07-55	48.2	14.0	14.9	7.7	11.1	2.8	0.5	1	0.2	0.2	0.05	0.07	0.6	102
MAR07-56	47.8	13.8	13.3	9.1	11.4	2.5	0.4	1	0.09	0.2	0.07	0.05	0.4	100
MAR07-57	48.8	14.2	13.7	8.3	10.6	2.7	0.4	1	0.1	0.2	0.07	0.05	0.1	101
MAR07-59	39.5	7.8	28.2	17.0	4.2	1.3	0.4	0.8	0.3	0.4	0.01	0.06	0.1	100
MAR07-61	46.3	15.7	15.1	10.0	10.6	2.3	0.5	0.7	0.3	0.2	0.03	0.04	-0.5	101
MAR07-65	41.7	6.1	16.5	21.2	8.2	0.9	0.1	1	0.2	0.2	0.3	0.04	3	100
MAR07-70	44.5	12.7	17.8	10.4	10.1	2.3	0.4	2	0.3	0.2	0.10	0.07	0.5	101
MAR07-71	45.4	13.2	17.3	8.0	11.0	2.7	0.5	2	0.3	0.2	0.06	0.08	0.6	101
MAR07-78	50.7	14.9	12.5	7.5	9.4	2.8	1	0.6	0.4	0.2	0.02	0.04	0.1	101
MAR07-91	30.8	10.8	36.2	7.6	6.3	1.7	0.3	5	0.3	0.3	0.06	0.3	-0.2	100
MAR07-95	49.6	15.7	12.0	6.6	11.2	2.9	0.3	0.9	0.02	0.2	0.04	0.05	0.4	100
MAR07-50	37.3	12.3	28.4	10.8	6.1	2.0	0.2	3	0.08	0.3	< 0.01	0.2	-0.4	100
MAR07-87	39.6	6.7	30.4	18.4	4.2	1.2	0.3	0.7	0.2	0.5	0.02	0.05	-2	100
MAR07-62	45.7	17.4	14.2	10.8	9.0	2.4	0.4	0.2	0.1	0.2	0.01	0.01	-0.6	100
MAR07-83	49.1	18.3	11.9	8.5	9.2	2.9	0.8	0.3	0.1	0.2	0.02	0.02	-0.03	101
MAR07-85	45.3	16.5	15.8	12.2	8.4	2.3	0.3	0.2	0.09	0.3	0.02	< 0.01	-0.8	101
MAR07-03	42.1	13.2	22.6	7.6	9.0	2.4	0.5	2	0.1	0.2	0.1	0.1	-0.1	100
MAR07-06	47.7	15.1	13.2	7.4	10.7	2.8	0.3	2	0.07	0.2	0.1	0.08	0.5	100
MAR07-23	36.0	12.7	22.9	5.1	12.5	2.6	0.7	3	5	0.3	0.01	0.1	0.1	101
MAR07-24	47.3	14.7	15.9	7.4	11.7	2.5	0.3	1	0.05	0.2	0.03	0.09	-0.09	102
MAR07-25	42.2	13.5	21.2	7.4	11.2	2.2	0.3	2	0.2	0.2	0.05	0.2	-0.4	101
MAR07-48	46.4	12.2	14.9	10.4	12.4	1.9	0.3	0.9	0.2	0.2	0.1	0.06	0.2	100
MAR07-54	47.3	15.7	13.2	7.2	11.7	2.7	0.5	1	0.3	0.2	0.03	0.06	0.6	100
MAR07-58	46.1	12.3	18.0	8.4	9.9	2.4	0.6	2	0.4	0.3	0.05	0.08	0.2	101
MAR07-64	46.7	13.6	12.4	7.6	14.8	2.1	0.4	0.9	0.6	0.2	0.02	0.05	1	101
MAR07-89	46.1	12.9	15.3	11.1	11.4	2.1	0.3	1	0.2	0.2	0.09	0.05	0.3	101
MAR07-99	47.3	16.8	9.0	6.9	13.3	2.5	0.5	0.4	0.09	0.1	0.04	0.03	1	99
MAR07-113	18.0	3.6	44.9	7.8	11.6	0.4	0.1	7	7	0.4	0.04	0.3	-2	99
MAR07-60	45.3	15.2	16.6	9.9	8.8	2.4	0.5	0.5	0.4	0.3	0.02	0.04	-0.3	100
MAR07-82	40.5	11.3	24.1	8.6	8.9	2.3	0.8	2	2	0.4	0.01	0.04	0.07	101
MAR07-114	42.8	7.6	19.9	8.2	14.1	1.8	0.7	2	3	0.4	0.02	0.07	0.3	100
MAR07-36	37.9	11.8	25.3	4.3	11.0	2.6	1.0	4	3	0.4	< 0.01	0.07	-0.84	101
MAR07-45	42.6	13.2	18.3	7.3	12.2	2.3	0.4	2	2	0.2	0.02	0.1	1	101
MAR07-72	48.3	10.7	17.7	5.0	11.0	3.3	1	1	0.4	0.4	0.04	0.03	1	101
MAR07-97	52.9	17.7	10.2	7.1	6.9	3.5	1	0.2	0.09	0.2	0.03	< 0.01	0.8	101
MIN	18.0	3.6	7.6	2.4	4.2	0.4	0.1	0.2	0.02	0.1	0.01	0.01	-2	99
MAX	55.0	18.3	44.9	21.2	14.8	4.5	2	7	7	0.5	0.3	0.3	3	102
MED	45.9	13.8	16.1	7.9	10.5	2.5	0	1	0	0	0	0	0	101
AVG	44.9	13.3	17.8	8.9	9.9	2.4	0.5	1	0.6	0.3	0.05	0.08	0.3	101
STDEV	6.0	3.1	7.1	3.6	2.3	0.7	0.3	1	1	0.08	0.04	0.07	1	1
TWO DUCK LAKE GABBRO (n = 32)														
MAR07-09	39.7	9.4	28.1	15.3	4.8	1.8	0.5	1	0.6	0.4	0.04	0.07	-2	100
MAR07-11	48.5	21.0	10.1	5.1	10.6	3.5	0.7	0.6	0.4	0.2	0.01	0.03	-0.2	101
MAR07-19	28.7	6.3	34.5	9.1	9.9	1.3	0.4	5	4	0.4	0.08	0.2	-0.2	99
MAR07-41	49.7	17.9	9.9	6.2	12.1	3.1	0.6	0.6	0.3	0.2	0.05	0.03	0.4	101
MAR07-47	46.8	15.4	13.6	9.1	11.1	2.3	0.5	0.7	0.1	0.2	0.03	0.06	0.2	100
MAR07-67	45.2	15.8	14.2	7.0	12.1	2.3	0.4	1	0.2	0.2	0.02	0.1	0.9	100
MAR07-68	45.5	15.0	14.7	7.4	12.9	2.3	0.3	1	0.1	0.2	0.02	0.13	0.4	100
MAR07-69	44.9	14.5	12.4	6.8	12.9	2.1	0.4	1	0.1	0.2	0.02	0.08	5	101
MAR07-84	47.0	16.9	12.8	9.0	10.5	2.6	0.5	0.4	0.2	0.2	0.03	0.03	-0.2	100
MAR07-86	47.1	16.1	14.2	9.9	10.7	2.5	0.5	0.5	0.3	0.2	0.03	0.02	-0.3	102
MAR07-106	48.2	18.0	8.6	6.4	12.7	2.7	0.5	0.5	0.2	0.1	0.04	0.03	1	99
MAR07-107	44.7	12.2	16.8	11.1	10.9	1.9	0.4	0.8	0.2	0.2	0.1	0.05	0.1	100
MAR07-108	48.2	18.9	8.8	4.4	13.0	3.0	0.6	0.8	0.2	0.1	0.04	0.04	2	100
MAR07-109	48.3	18.8	8.0	4.2	12.6	3.3	0.5	0.8	0.3	0.1	0.02	0.05	3	100
MAR07-14	46.7	15.1	12.2	5.4	11.5	3.3	0.9	1	0.5	0.2	0.03	0.06	3	100
MAR07-15	43.2	13.1	19.5	5.1	11.4	2.3	0.4	1	0.2	0.2	0.02	0.08	3	99
MAR07-21	38.2	5.5	29.5	8.3	11.1	1.4	0.7	4	0.8	0.4	0.03	0.1	0.4	100

TABLE D2
RESULTS OF WHOLE ROCK ANALYSIS
MARATHON PGM-Cu PROJECT

SAMPLE ID	WHOLE ROCK ANALYSIS													
	SiO ₂ (%)	Al ₂ O ₃ (%)	Fe ₂ O ₃ (%)	MgO (%)	CaO (%)	Na ₂ O (%)	K ₂ O (%)	TiO ₂ (%)	P ₂ O ₅ (%)	MnO (%)	Cr ₂ O ₃ (%)	V ₂ O ₅ (%)	LOI (%)	Sum (%)
MAR07-28	42.0	9.3	24.5	15.0	5.8	1.8	0.5	0.8	0.4	0.4	0.03	0.04	0.3	101
MAR07-29	46.9	16.6	13.6	9.0	9.1	2.9	0.6	0.4	0.5	0.2	0.02	0.02	0.7	101
MAR07-30	47.7	14.0	13.1	8.3	10.7	2.4	0.9	0.5	0.1	0.2	0.04	0.04	2	100
MAR07-31	49.0	16.3	8.8	5.9	13.3	2.9	0.6	0.6	0.5	0.2	0.03	0.04	2	101
MAR07-63	47.5	16.5	9.5	5.8	13.9	2.6	0.5	0.8	0.3	0.1	0.03	0.05	2	100
MAR07-79	45.1	14.1	15.4	9.8	11.3	2.0	0.5	0.7	0.2	0.2	0.03	0.04	1	100
MAR07-80	46.6	17.3	12.7	6.7	12.1	2.6	0.4	0.8	0.1	0.2	0.03	0.06	0.8	100
MAR07-88	47.7	18.2	13.6	6.9	9.9	3.1	0.6	0.6	0.5	0.2	0.02	0.03	-0.1	101
MAR07-90	48.4	16.1	11.7	7.8	12.1	2.6	0.4	0.8	0.2	0.2	0.03	0.04	0.9	101
MAR07-93	47.7	15.5	9.7	6.6	14.3	2.5	0.5	0.9	0.6	0.2	0.04	0.06	2	100
MAR07-94	49.3	17.9	7.5	4.9	13.6	3.2	0.7	0.7	0.4	0.1	0.03	0.04	2	100
MAR07-98	46.8	16.2	11.4	7.8	9.9	2.8	0.8	0.3	0.1	0.2	0.03	0.02	4	100
MAR07-22	47.1	17.7	11.9	3.7	11.3	3.8	0.9	1	1	0.2	0.02	0.05	2	101
MAR07-76	41.3	14.4	19.9	4.3	10.4	3.0	0.9	4	2	0.3	< 0.01	0.04	0.08	100
MAR07-77	44.5	15.8	15.0	3.8	10.1	3.4	1	3	2	0.2	< 0.01	0.02	2	100
MIN	28.7	5.5	7.5	3.7	4.8	1.3	0.3	0.3	0.1	0.1	0.01	0.02	-2	99
MAX	49.7	21.0	34.5	15.3	14.3	3.8	1	5	4	0.4	0.1	0.2	5	102
MED	46.9	16.0	13.0	6.9	11.3	2.6	1	1	0	0	0	0	1	100
AVG	45.6	15.2	14.6	7.4	11.2	2.6	0.6	1	0.6	0.2	0.03	0.05	1	100
STDEV	4.1	3.5	6.5	2.8	2.0	0.6	0.2	1	0.7	0.08	0.02	0.04	1	1
VOLCANIC (n = 10)														
MAR07-102	51.2	15.1	11.8	6.2	9.6	3.5	0.6	2	0.1	0.2	0.07	0.05	0.5	100
MAR07-105	64.2	15.5	5.1	2.5	5.5	4.0	2	0.6	0.3	0.1	0.04	0.02	1	101
MAR07-111	60.0	14.7	7.2	3.5	5.5	5.0	1.54	0.9	0.2	0.1	0.04	0.02	1	100
MAR07-110	38.4	11.4	26.9	4.0	9.4	2.1	0.5	0.5	0.4	0.2	0.03	0.03	4	98
MAR07-17	64.2	14.2	4.7	1.9	7.0	3.7	1	0.6	0.3	0.1	0.05	0.01	2	100
MAR07-33	48.7	14.8	12.5	3.8	12.7	2.4	0.3	0.4	0.4	0.4	0.03	0.02	2	99
MAR07-52	58.6	15.6	6.8	4.1	8.5	3.0	2	1	0.3	0.1	0.04	0.02	1	101
MAR07-66	60.0	14.4	8.9	2.9	7.2	3.0	0.7	0.6	0.3	0.2	0.03	0.02	1	100
MAR07-96	43.8	14.5	19.1	4.6	8.3	3.7	0.6	0.3	0.3	0.2	0.03	0.01	3	99
MAR07-34	51.3	14.3	13.5	5.9	10.5	3.3	0.6	1	0.2	0.2	0.03	0.06	0.2	102
MIN	38.4	11.4	4.7	1.9	5.5	2.1	0.3	0.3	0.1	0.1	0.03	0.01	0.2	98
MAX	64.2	15.6	26.9	6.2	12.7	5.0	2	2	0.4	0.4	0.07	0.06	4	102
MED	54.9	14.6	10.4	3.9	8.4	3.4	1	1	0	0	0	0	1	100
AVG	54.0	14.5	11.7	3.9	8.4	3.4	1.0	0.8	0.3	0.2	0.04	0.03	2	100
STDEV	8.8	1.2	6.9	1.4	2.2	0.8	0.5	0.4	0.09	0.08	0.01	0.02	1	1
HETEROLITHIC BRECCIA (n = 6)														
MAR07-02	48.8	16.3	11.6	4.6	11.2	3.5	0.8	1	0.3	0.2	0.02	0.1	1	100
MAR07-100	47.9	16.8	12.3	5.2	11.6	3.1	0.5	0.8	0.3	0.2	0.03	0.06	1	100
MAR07-35	45.1	13.5	15.7	9.6	12.6	2.0	0.4	1	0.7	0.3	0.04	0.04	0.6	102
MAR07-49	48.0	14.6	10.8	6.8	14.0	2.2	0.3	0.6	0.1	0.2	0.06	0.04	2	99
MAR07-74	35.3	5.2	33.7	16.7	4.3	0.8	0.2	2	0.5	0.5	0.04	0.1	1	100
MAR07-81	46.7	16.3	11.2	8.4	13.2	2.1	0.4	0.5	0.2	0.2	0.04	0.04	1	101
MIN	35.3	5.2	10.8	4.6	4.3	0.8	0.2	0.5	0.1	0.2	0.02	0.04	0.6	99
MAX	48.8	16.8	33.7	16.7	14.0	3.5	0.8	2	0.7	0.5	0.06	0.1	2	102
MED	47.3	15.4	12.0	7.6	12.1	2.2	0	1	0	0	0	0	1	100
AVG	45.3	13.8	15.9	8.6	11.2	2.3	0.4	1	0.3	0.2	0.04	0.07	1	100
STDEV	5.1	4.4	8.9	4.4	3.5	1.0	0.2	0.4	0.2	0.1	0.01	0.04	0.4	1
SYENITE (n = 7)														
MAR07-20	54.3	10.5	16.5	1.0	5.8	3.5	4	2	0.6	0.3	0.02	0.01	1	99
MAR07-26	60.0	14.7	7.4	0.3	2.9	5.7	5	0.4	0.05	0.2	0.02	< 0.01	2	99
MAR07-40	66.7	12.8	4.6	2.0	2.4	3.3	4	0.4	0.04	0.07	0.03	< 0.01	3	99
MAR07-73	56.7	16.0	9.1	0.6	4.1	5.4	4	0.6	0.2	0.2	0.01	< 0.01	3	100
MAR07-75	60.5	14.3	5.4	0.9	5.5	4.1	4	0.3	0.09	0.2	0.03	< 0.01	4	99
MAR07-92	60.8	14.9	6.6	2.1	4.3	5.3	4	0.4	0.2	0.1	0.04	0.01	2	101
MAR07-13	54.6	11.0	14.1	1.2	6.6	4.6	3	0.5	0.1	0.4	< 0.01	< 0.01	2	98
MIN	54.3	10.5	4.6	0.3	2.4	3.3	3	0.3	0.04	0.07	0.01	0.01	1	98
MAX	66.7	16.0	16.5	2.1	6.6	5.7	5	2	0.6	0.4	0.04	0.01	4	101
MED	60.0	14.3	7.4	1.0	4.3	4.6	4	0	0	0	0	0	2	99
AVG	59.1	13.5	9.1	1.2	4.5	4.5	4	0.7	0.2	0.2	0.02	0.01	2	99
STDEV	4.3	2.1	4.5	0.7	1.5	1.0	0.5	0.6	0.2	0.1	0.01	0.00	1	1
SERPENTINITE (n = 2)														
MAR07-103	53.7	14.0	9.7	6.1	7.5	3.6	1	1	0.4	0.2	0.06	0.04	3	100
MAR07-104	56.7	14.8	5.3	2.8	9.0	5.1	1	0.6	0.2	0.1	0.03	0.02	5	100
MIN	53.7	14.0	5.3	2.8	7.5	3.6	1	0.6	0.2	0.1	0.03	0.02	3	100
MAX	56.7	14.8	9.7	6.1	9.0	5.1	1	1	0.4	0.2	0.06	0.04	5	100
MED	55.2	14.4	7.5	4.4	8.3	4.4	1	1	0	0	0	0	4	100
AVG	55.2	14.4	7.5	4.4	8.3	4.4	1	0.8	0.3	0.1	0.04	0.03	4	100
STDEV	2.1	0.6	3.1	2.3	1.0	1.0	0.06	0.3	0.2	0.04	0.02	0.01	1	0
TAILINGS - COMBINED (n = 1)														
Average Grade Ore	46.9	15.5	12.7	7.4	12.5	2.4	0.5	1	0.3	0.2	0.06	0.06	1	100

TABLE D3
RESULTS OF BULK METAL ANALYSIS
MARATHON PGM-Cu PROJECT

SAMPLE ID	BULK METAL ANALYSIS																												
	Ag (mg/kg)	Al (mg/kg)	As (mg/kg)	Ba (mg/kg)	Be (mg/kg)	Bi (mg/kg)	Ca (mg/kg)	Cd (mg/kg)	Co (mg/kg)	Cr (mg/kg)	Cu (mg/kg)	Fe (mg/kg)	K (mg/kg)	Li (mg/kg)	Mg (mg/kg)	Mn (mg/kg)	Mo (mg/kg)	Ni (mg/kg)	Pb (mg/kg)	Sb (mg/kg)	Se (mg/kg)	Sn (mg/kg)	Sr (mg/kg)	Ti (mg/kg)	Tl (mg/kg)	U (mg/kg)	V (mg/kg)	Y (mg/kg)	Zn (mg/kg)
EASTERN GABBRO (n = 57)																													
MAR07-01	0.28	62000	13	270	0.3	0.06	51000	0.17	100	290	400	160000	3700	2.5	70000	1900	1.5	230	3.5	4	0.5	0.9	390	6100	0.05	0.33	460	8.2	160
MAR07-04	0.26	78000	1	320	0.4	0.08	74000	0.32	58	350	200	120000	4800	2.5	45000	1300	0.81	140	3	0.8	0.5	1.7	420	5400	0.05	0.57	390	11	98
MAR07-05	0.18	79000	1	340	0.4	0.03	67000	0.33	38	140	42	73000	5000	2.5	30000	970	0.48	63	4.6	0.4	0.5	1.3	290	3000	0.05	0.3	230	13	73
MAR07-07	0.1	86000	1	180	0.3	0.01	76000	0.14	42	420	42	80000	3100	2.5	43000	1000	0.48	140	2.2	0.2	0.5	0.5	390	5200	0.05	0.11	260	11	81
MAR07-08	0.07	56000	1	210	0.2	0.01	30000	0.07	150	130	34	250000	2300	6	81000	2500	7	290	1.4	0.2	0.5	0.6	390	14000	0.05	0.08	1400	2.4	200
MAR07-10	0.09	48000	1	210	0.2	0.02	32000	0.08	140	170	31	210000	2400	7	110000	2700	0.55	330	2.4	0.2	0.5	0.4	350	5000	0.05	0.19	420	4.2	180
MAR07-101	0.66	80000	1	260	1.5	0.16	55000	0.26	66	160	880	70000	7400	14	32000	1100	1.1	180	7.7	0.05	1	1.1	600	2000	0.05	1.7	130	20	100
MAR07-112	0.13	70000	1	270	0.6	0.09	60000	0.16	52	93	160	92000	6500	2.5	35000	1300	0.84	110	6	0.05	0.5	0.8	220	5500	0.05	0.56	280	24	110
MAR07-12	0.1	83000	1	390	0.8	0.03	50000	0.08	87	75	38	120000	7100	19	76000	1800	0.91	230	4.5	0.3	0.5	0.9	550	1300	0.05	0.88	67	13	110
MAR07-16	1	72000	1	310	0.8	0.2	60000	0.45	81	140	5700	97000	7900	9	23000	1100	1.7	390	9.2	0.1	2	0.8	420	1700	0.05	0.32	130	15	86
MAR07-18	0.2	55000	1	780	0.9	0.14	80000	0.26	56	99	370	160000	8700	2.5	30000	1800	2.5	59	8.8	0.7	1	1.3	440	15000	0.2	1.5	340	48	170
MAR07-27	1	84000	14	350	0.7	0.48	53000	0.3	40	220	1200	59000	3000	6	31000	820	0.89	110	11	0.2	2	0.6	760	1100	0.05	0.15	97	8	79
MAR07-32	0.28	74000	1	370	4.4	0.08	48000	0.14	19	160	260	51000	14000	11	13000	800	2.1	41	14	0.05	1	2.1	370	1500	0.1	7.7	140	62	66
MAR07-37	0.09	73000	1	190	0.3	0.04	77000	0.2	53	150	160	110000	3000	2.5	38000	1300	0.76	79	1.5	0.2	0.5	1.2	260	6500	0.2	0.1	390	12	100
MAR07-38	0.25	74000	1	350	0.4	0.03	63000	0.11	69	490	340	110000	5000	2.5	45000	1400	0.52	150	1.7	0.1	1	2.3	420	5700	0.2	0.36	410	8	100
MAR07-39	0.24	70000	1	330	0.4	0.07	58000	0.12	78	270	360	120000	4500	2.5	50000	1500	0.63	160	3.1	0.4	0.5	0.9	380	6300	0.2	0.23	400	9.2	120
MAR07-42	0.25	60000	1	330	0.3	0.02	70000	0.13	87	490	240	120000	3100	2.5	70000	1600	0.46	300	13	0.1	0.5	0.5	410	4400	0.05	0.27	300	10	110
MAR07-43	0.22	71000	1	330	0.6	0.04	61000	0.11	60	180	280	93000	7200	2.5	44000	1300	0.54	120	3	0.05	0.5	0.7	460	3800	0.1	0.91	220	13	94
MAR07-44	0.11	79000	1	350	0.4	0.01	74000	0.11	62	280	100	100000	3900	2.5	50000	1400	0.48	130	1.3	0.1	0.5	0.8	470	4500	0.05	0.21	260	9.9	94
MAR07-46	0.37	66000	1	360	0.4	0.03	68000	0.14	79	290	660	110000	4800	2.5	63000	1600	0.47	200	2.9	0.05	0.5	0.5	470	3700	0.05	0.46	220	13	110
MAR07-51	0.25	38000	4	290	1.9	0.07	60000	0.16	34	140	54	130000	3100	13	90000	820	1.1	360	7	0.6	2	1.7	260	4800	0.2	2.2	120	17	91
MAR07-53	0.07	72000	1	320	0.6	0.005	83000	0.1	54	140	95	84000	3400	2.5	46000	1200	0.32	92	1.9	0.05	1	0.6	490	5000	0.05	0.52	310	11	84
MAR07-55	0.08	72000	1	340	0.4	0.02	73000	0.16	55	420	110	100000	5100	2.5	46000	1200	0.32	190	1.8	0.05	1	0.7	350	5200	0.05	0.19	240	12	90
MAR07-56	0.05	67000	1	280	0.4	0.005	72000	0.15	55	390	71	89000	4000	2.5	52000	1300	1.7	180	1.8	0.05	0.5	0.7	400	6500	0.05	0.18	290	13	100
MAR07-57	0.27	72000	1	260	0.5	0.06	69000	0.15	63	230	290	94000	4500	2.5	49000	1500	1	140	3.4	3.2	0.5	2	380	9000	0.3	0.64	400	16	120
MAR07-59	0.09	40000	1	220	0.5	0.01	28000	0.09	160	78	72	200000	4300	11	100000	3100	0.96	320	1.6	0.4	1	1	280	4400	0.2	0.51	280	8.7	200
MAR07-61	0.07	79000	1	430	0.4	0.005	69000	0.1	71	150	67	100000	5000	2.5	59000	1600	0.48	160	1.5	0.1	0.5	0.5	620	3400	0.05	0.36	190	9.8	100
MAR07-65	0.19	29000	1	140	0.3	0.03	52000	0.11	100	1150	270	110000	1600	2.5	120000	1500	0.45	1050	1.5	0.1	0.5	0.8	200	5000	0.05	0.2	170	12	120
MAR07-70	0.47	64000	1	350	0.5	0.07	65000	0.12	73	550	460	120000	4700	2.5	62000	1600	1.7	300	2.2	0.7	0.5	7.7	430	7600	0.05	0.45	380	13	120
MAR07-71	0.24	67000	1	290	0.6	0.12	72000	0.15	62	370	450	120000	4900	8	48000	1400	0.59	140	2.8	0.05	0.5	1.1	410	8700	0.05	0.69	430	17	110
MAR07-78	0.2	68000	1	380	2	0.02	55000	3.6	58	62	70	78000	12000	9	40000	1300	4.1	100	7.9	0.05	0.5	2.4	470	3300	0.05	3.3	190	21	95
MAR07-91	1.1	49000	1	260	0.3	0.17	39000	0.65	120	340	1900	230000	3300	2.5	41000	2000	0.65	250	4.7	0.05	1	1.1	330	25000	0.05	0.51	1600	8.7	230
MAR07-95	0.14	89000	1	440	0.5	0.09	87000	0.11	27	120	99	50000	6900	5	29000	85													

TABLE D3
RESULTS OF BULK METAL ANALYSIS
MARATHON PGM-Cu PROJECT

SAMPLE ID	BULK METAL ANALYSIS																													
	Ag (mg/kg)	Al (mg/kg)	As (mg/kg)	Ba (mg/kg)	Be (mg/kg)	Bi (mg/kg)	Ca (mg/kg)	Cd (mg/kg)	Co (mg/kg)	Cr (mg/kg)	Cu (mg/kg)	Fe (mg/kg)	K (mg/kg)	Li (mg/kg)	Mg (mg/kg)	Mn (mg/kg)	Mo (mg/kg)	Ni (mg/kg)	Pb (mg/kg)	Sb (mg/kg)	Se (mg/kg)	Sn (mg/kg)	Sr (mg/kg)	Ti (mg/kg)	Tl (mg/kg)	U (mg/kg)	V (mg/kg)	Y (mg/kg)	Zn (mg/kg)	
MAR07-28	0.12	47000	1	300	0.5	0.02	34000	0.11	130	130	140	170000	5400	11	90000	2500	0.9	290	4.8	0.05	1	0.7	260	2300	0.05	0.67	170	11	160	
MAR07-29	0.15	89000	1	410	0.6	0.03	62000	0.09	73	110	80	99000	6300	11	56000	1600	1.1	160	4.7	0.05	0.5	0.6	610	1400	0.1	0.64	87	14	94	
MAR07-30	0.17	67000	1	310	1.9	0.01	65000	0.13	58	220	45	85000	8500	11	46000	1500	0.76	130	4.1	0.2	0.5	0.8	450	1900	0.05	1.8	160	26	93	
MAR07-31	0.2	88000	1	420	0.4	0.02	91000	0.09	37	160	300	63000	5800	2.5	37000	910	0.53	78	2	0.2	0.5	0.5	620	2200	0.05	0.36	220	14	51	
MAR07-63	1.6	85000	1	410	0.5	0.26	92000	0.42	45	130	2700	66000	5400	2.5	35000	910	0.6	240	4.5	0.05	3	1	620	3700	0.1	0.45	230	14	75	
MAR07-79	0.84	44000	1	220	0.3	0.21	46000	0.64	57	95	1400	67000	3000	2.5	37000	1100	0.52	190	1.9	0.05	1	0.5	340	2400	0.05	0.32	160	7.7	78	
MAR07-80	1.5	74000	1	300	0.3	0.23	67000	0.65	61	100	3100	74000	3800	2.5	34000	1100	0.63	200	5.5	0.05	2	0.6	630	3300	0.05	0.33	300	7.9	120	
MAR07-88	0.1	87000	1	470	0.5	0.03	60000	0.47	60	78	61	88000	5500	6	39000	1400	0.54	110	3.1	0.05	0.5	0.5	680	2200	0.05	0.47	180	10	93	
MAR07-90	0.12	79000	1	340	0.5	0.01	77000	0.52	52	150	120	78000	4300	2.5	46000	1100	0.47	120	2	0.05	0.5	0.5	530	3300	0.05	0.47	210	12	81	
MAR07-93	0.83	73000	1	360	0.6	0.07	89000	0.17	39	130	1200	62000	5400	2.5	37000	1000	0.65	98	2.8	0.05	1	0.6	530	3000	0.05	0.67	260	18	76	
MAR07-94	0.11	86000	1	440	0.6	0.11	85000	0.1	27	110	100	49000	7100	6	29000	860	0.51	54	1.9	0.05	0.5	0.4	670	3000	0.05	0.45	210	14	57	
MAR07-98	0.14	78000	3	340	1.7	0.04	61000	0.12	56	110	43	75000	8100	9	44000	1300	1.7	130	8.1	0.1	0.5	1.6	530	1700	0.2	1.5	120	15	98	
MAR07-22	0.23	92000	1	830	1	0.06	75000	0.16	37	100	320	82000	8700	10	22000	1100	1.4	32	6.2	0.1	1	0.9	820	5000	0.1	0.93	240	25	93	
MAR07-76	0.05	72000	1	2800	0.5	0.01	66000	0.12	52	54	82	140000	8400	2.5	25000	1900	1.5	7.2	2.3	0.05	2	0.6	1300	9900	0.05	0.67	160	23	150	
MAR07-77	0.48	80000	1	2800	0.9	0.03	65000	0.0015	38	52	43	100000	12000	7	20000	1700	1.4	3.6	3.5	0.2	0.5	0.7	1120	12000	0.05	1.2	72	25	120	
MIN	0.05	30000	1	220	0.3	0.005	34000	0.00	27	52	43	49000	3000	2.5	20000	800	0.31	4	1.4	0.05	0.5	0.4	230	1400	0.05	0.32	72	7.7	51	
MAX	2.50	110000	3	2800	1.9	0.610	92000	0.73	140	460	7300	240000	12000	23.0	96000	2800	2.90	490	18.0	0.30	3.0	1.8	1300	18000	0.20	1.80	780	46.0	230	
MED	0.21	78000.00	1.00	390.00	0.50	0.04	73000.00	0.14	56.50	115.00	255.00	85500.00	5450.00	2.50	38000.00	1200.00	0.69	125.00	3.50	0.05	0.75	0.70	585.00	3300.00	0.05	0.56	215.00	13.00	92.00	
AVG	0.51	74969	1	541	0.7	0.097	71000.0	0.25	61.3	142.6	884.81	98656.25	5918.8	5.8	42781	1373	0.98	150	4.3	0.10	1.0	0.8	599	4638	0.06	0.68	262	15.8	101	
STDEV	0.66	17891	0	603	0.4	0.126	14018.4	0.20	28.5	90.33	1645.94	47664.56	1857	5.0	17123	518	0.64	110	3.2	0.08	0.7	0.3	222	3955	0.03	0.37	165	8.5	47	
VOLCANIC (n = 10)																														
MAR07-102	0.15	73000	1	280	0.5	0.07	59000	0.13	46	220	180	76000	6100	2.5	35000	1100	0.6	140	2.8	0.05	0.5	0.6	430	7300	0.05	0.25	250	12	100	
MAR07-105	0.17	76000	1	570	1.4	0.14	35000	0.12	19	75	68	34000	16000	6	15000	720	3.4	42	7.5	0.2	0.5	1.2	530	3100	0.05	0.95	93	16	84	
MAR07-111	0.33	69000	2	360	1.1	0.1	34000	0.08	26	89	100	47000	15000	2.5	20000	820	1.3	74	8.4	0.05	0.5	1.6	420	4600	0.05	1.4	140	18	67	
MAR07-110	1.8	53000	3	120	0.7	0.4	51000	0.53	180	150	5700	180000	5100	7	23000	1100	5.4	580	8.6	0.2	4	6.4	380	2000	0.05	0.74	130	13	96	
MAR07-17	0.78	77000	1	440	0.9	0.18	49000	0.19	16	190	380	34000	13000	15	12000	770	2	50	8.9	1.2	0.5	1.5	400	2100	0.4	1	74	12	60	
MAR07-33	2.8	80000	4	220	1.6	0.47	89000	0.89	56	160	3300	94000	3300	10	24000	2500	1.1	220	11	0.2	2	2	580	1600	0.1	2.3	110	29	210	
MAR07-52	0.18	76000	1	380	0.3	0.005	54000	0.12	50	180	190	46000	14000	2.5	24000	1300	0.32	72	1.7	0.05	0.5	0.6	390	4600	0.05	0.12	280	12	80	
MAR07-66	0.29	71000	1	360	1.1	0.13	46000	0.18	26	170	580	60000	7000	7	17000	1700	1.8	66	4.2	0.3	0.5	1.1	440	2800	0.1	0.64	92	13	77	
MAR07-96	0.07	77000	1	200	0.4	0.01	71000	0.14	47	140	33	79000	3100	2.5	37000	1200	0.51	91	2.3	0.4	0.5	0.5	290	3800	0.05	0.05	250	11	87	
MAR07-34	0.18	74000	1	310	0.7	0.04	66000	0.13	41	160	120	82000	6400	7	30000	1100	0.79	58	4.5	0.05	0.5	0.9	250	4100	0.05	0.61	260	23	84	
MIN	0.07	53000	1	120	0.3	0.005	34000	0.08	16	75	33	34000	3100	2.5	12000	720	0.32	42	1.7	0.05	0.5	0.5	250	1600	0.05	0.05	74	11.0	60	
MAX	2.80	80000	4	570	1.6	0.470	89000	0.89	180	220	5700	180000	16000	15.0	37000	2500	5.40	580	11.0	1.20	4.0	6.4	580	7300	0.40	2.30	280	29.0	210	
MED	0.23	75000.00	1.00	335.00	0.80	0.11	52500.00	0.13	43.50	160.00	185.00	68000.00	6700.00	6.50	23500.00	1100.00	1.20	73.00	6.00	0.20	0.50	1.15	410.00	3450.00	0.05	0.69	135.00	13.00	84.00	
AVG	0.67	72600	2	324	0.9	0.155	55400.0	0.25	50.7	153.4	1065.10	73200.00	8900.0	6.2	23700	1231	1.72	139	6.0	0.27	1.0	1.6	411	3600	0.10	0.81	168	15.9	95	
STDEV	0.91	7589	1	129	0.4	0.159	16741.2	0.26	47.5	43.88	1903.65	42987.85	5029	4.1	8274	530	1.58	164	3.3	0.35	1.2	1.7	98	1689	0.11					

TABLE D4
RESULTS OF SHORT-TERM LEACH TESTS
MARATHON PGM-Cu PROJECT

Sample ID	SPLP Analysis																																
	Hg mg/L	Al mg/L	As mg/L	Ag mg/L	Ba mg/L	Be mg/L	B mg/L	Bi mg/L	Ca mg/L	Cd mg/L	Co mg/L	Cr mg/L	Cu mg/L	Fe mg/L	K mg/L	Li mg/L	Mg mg/L	Mn mg/L	Mo mg/L	Na mg/L	Ni mg/L	Pb mg/L	Sb mg/L	Se mg/L	Sn mg/L	Sr mg/L	Ti mg/L	Tl mg/L	U mg/L	V mg/L	W mg/L	Y mg/L	Zn mg/L
EASTERN GABBRO (n = 20)																																	
MAR07-01	0.00005	0.650	0.0015	0.00005	0.322	0.0002	0.090	0.00001	2.42	0.00003	0.00142	0.00050	0.0066	1.56	1.52	0.001	1.16	0.021	0.018	17.20	0.0028	0.0019	0.0046	0.0005	0.0015	0.02	0.023	0.00020	0.00001	0.032	0.0012	0.00033	0.009
MAR07-08	0.00005	0.020	0.0008	0.00005	0.351	0.0002	0.016	0.00001	15.60	0.00003	0.00008	0.00015	0.0005	0.01	1.54	0.001	16.90	0.004	0.060	4.82	0.0008	0.0019	0.0013	0.0005	0.0008	0.11	0.000	0.00005	0.00001	0.011	0.0010	0.00002	0.003
MAR07-10	0.00005	0.005	0.0008	0.00005	0.372	0.0002	0.040	0.00001	18.00	0.00008	0.00018	0.00015	0.0004	0.01	4.08	0.001	19.60	0.151	0.003	5.38	0.0013	0.0313	0.0010	0.0005	0.0008	0.12	0.000	0.00005	0.00001	0.00003	0.0003	0.00001	0.007
MAR07-16	0.00005	0.070	0.0005	0.00005	0.180	0.0002	0.062	0.00001	11.50	0.00003	0.00005	0.00015	0.0016	0.01	1.18	0.001	0.59	0.004	0.005	11.90	0.0004	0.0014	0.0013	0.0005	0.0008	0.10	0.001	0.00005	0.00001	0.003	0.0003	0.00001	0.018
MAR07-18	0.00005	0.120	0.0018	0.00005	0.259	0.0002	0.058	0.00001	3.42	0.00003	0.00009	0.00015	0.0010	0.09	6.22	0.001	0.64	0.002	0.005	10.20	0.0004	0.0011	0.0011	0.0005	0.0002	0.03	0.001	0.00005	0.00001	0.008	0.0007	0.00001	0.022
MAR07-27	0.00005	0.260	0.0003	0.00005	0.196	0.0002	0.055	0.00001	4.11	0.00003	0.00009	0.00015	0.0058	0.14	0.45	0.001	0.25	0.002	0.004	18.10	0.0004	0.0018	0.0009	0.0005	0.0004	0.05	0.003	0.00005	0.00001	0.011	0.0003	0.00002	0.005
MAR07-46	0.00005	0.270	0.0020	0.00005	0.295	0.0002	0.030	0.00001	2.44	0.00003	0.00010	0.00015	0.0017	0.14	3.76	0.001	0.73	0.002	0.009	13.60	0.0004	0.0285	0.0011	0.0005	0.0016	0.03	0.002	0.00005	0.00001	0.015	0.0009	0.00001	0.007
MAR07-50	0.00005	0.180	0.0001	0.00005	0.377	0.0002	0.052	0.00001	4.13	0.00003	0.00025	0.00015	0.0009	0.26	1.16	0.001	1.92	0.004	0.004	6.74	0.0004	0.0010	0.0008	0.0005	0.0007	0.04	0.005	0.00005	0.00001	0.012	0.0002	0.00001	0.011
MAR07-51	0.00005	0.020	0.0004	0.00005	0.278	0.0002	0.076	0.00001	4.22	0.00003	0.00006	0.00015	0.0005	0.01	13.00	0.001	2.03	0.001	0.003	10.90	0.0008	0.0269	0.0009	0.0005	0.0002	0.03	0.000	0.00005	0.00001	0.003	0.0003	0.00001	0.043
MAR07-59	0.00005	0.160	0.0017	0.00005	0.287	0.0002	0.049	0.00001	1.30	0.00003	0.00029	0.00015	0.0007	0.42	2.07	0.001	0.31	0.008	0.003	18.80	0.0011	0.0011	0.0008	0.0005	0.0005	0.02	0.002	0.00005	0.00001	0.004	0.0005	0.00002	0.007
MAR07-62	0.00005	0.340	0.0003	0.00005	0.303	0.0002	0.035	0.00001	4.03	0.00003	0.00009	0.00015	0.0005	0.08	0.77	0.001	0.54	0.001	0.003	8.06	0.0004	0.0016	0.0007	0.0005	0.0006	0.03	0.001	0.00005	0.00001	0.004	0.0005	0.00001	0.006
MAR07-65	0.00005	0.005	0.0003	0.00005	0.248	0.0002	0.036	0.00001	6.53	0.00010	0.00005	0.00015	0.0005	0.01	1.36	0.001	0.92	0.001	0.001	15.50	0.0008	0.0521	0.0006	0.0005	0.0005	0.06	0.000	0.00005	0.00001	0.000	0.0005	0.00001	0.004
MAR07-70	0.00005	0.500	0.0006	0.00005	0.297	0.0002	0.060	0.00048	2.22	0.00003	0.00028	0.00050	0.0034	0.38	0.77	0.001	0.39	0.006	0.004	14.20	0.0012	0.0265	0.0010	0.0005	0.0004	0.02	0.008	0.00005	0.00026	0.012	0.0003	0.00003	0.010
MAR07-78	0.00005	0.300	0.0012	0.00005	0.309	0.0002	0.031	0.00007	4.14	0.00003	0.00010	0.00015	0.0007	0.12	1.25	0.001	0.50	0.003	0.010	5.71	0.0004	0.0011	0.0008	0.0005	0.0005	0.03	0.003	0.00005	0.00021	0.004	0.0005	0.00016	0.005
MAR07-91	0.00005	0.070	0.0004	0.00005	0.208	0.0002	0.024	0.00004	5.83	0.00003	0.00006	0.00015	0.0013	0.02	3.60	0.001	1.92	0.001	0.002	5.98	0.0004	0.0059	0.0007	0.0005	0.0007	0.05	0.001	0.00005	0.00003	0.003	0.0002	0.00001	0.004
MAR07-95	0.00005	0.640	0.0001	0.00005	0.298	0.0002	0.030	0.00003	2.01	0.00003	0.00031	0.00040	0.0004	0.28	0.68	0.001	0.18	0.003	0.004	15.50	0.0004	0.0012	0.0012	0.0005	0.0003	0.02	0.012	0.00005	0.00004	0.023	0.0006	0.00003	0.008
MAR07-99	0.00005	0.300	0.0222	0.00005	0.236	0.0002	0.044	0.00003	4.05	0.00003	0.00012	0.00015	0.0147	0.17	3.75	0.001	0.41	0.002	0.003	20.40	0.0013	0.0244	0.0009	0.0060	0.0004	0.05	0.003	0.00005	0.00001	0.012	0.0016	0.00001	0.003
MAR07-101	0.00005	0.250	0.0006	0.00005	0.296	0.0002	0.069	0.00003	7.26	0.00003	0.00033	0.00070	0.0043	0.29	4.84	0.001	0.83	0.004	0.004	17.80	0.0015	0.0019	0.0009	0.0005	0.0006	0.07	0.005	0.00005	0.00007	0.005	0.0010	0.00014	0.007
MAR07-112	0.00005	1.420	0.0005	0.00005	0.417	0.0002	0.060	0.00002	6.82	0.00003	0.00126	0.00200	0.0035	1.31	0.60	0.001	1.12	0.011	0.006	5.45	0.0023	0.0026	0.0025	0.0005	0.0013	0.05	0.116	0.00005	0.00033	0.050	0.0012	0.00019	0.007
MAR07-113	0.00005	0.070	0.0005	0.00005	0.198	0.0002	0.034	0.00001	5.15	0.00003	0.00005	0.00015	0.0011	0.01	13.80	0.001	2.26	0.001	0.003	5.44	0.0004	0.0007	0.0007	0.0005	0.0007	0.04	0.002	0.00005	0.00001	0.014	0.0003	0.00001	0.006
MIN	0.00005	0.005	0.0001	0.00005	0.180	0.0002	0.016	0.00001	1.30	0.00003	0.00005	0.00015	0.0004	0.01	0.45	0.001	0.18	0.001	0.001	4.82	0.0004	0.0007	0.0006	0.0005	0.0002	0.02	0.000	0.00005	0.00001	0.000	0.0002	0.00001	0.003
MAX	0.00005	1.420	0.0222	0.00005	0.417	0.0002	0.090	0.00048	18.00	0.00010	0.00142	0.00200	0.0147	1.56	13.80	0.001	19.60	0.151	0.060	20.40	0.0028	0.0521	0.0046	0.0060	0.0016	0.12	0.116	0.00020	0.00033	0.050	0.0016	0.00033	0.043
MED	0.00005	0.215	0.0006	0.00005	0.295	0.0002	0.046	0.00001	4.13	0.00003	0.00010	0.00015	0.0011	0.13	1.53	0.001	0.78	0.003	0.004	11.40	0.0006	0.0019	0.0009	0.0005	0.0006	0.04	0.002	0.00005	0.00001	0.010	0.0005	0.00001	0.007
AVG	0.00005	0.282	0.0018	0.00005	0.286	0.0002	0.048	0.00004	5.76	0.00004	0.00026	0.00032	0.0025	0.26	3.32	0.001	2.66	0.															

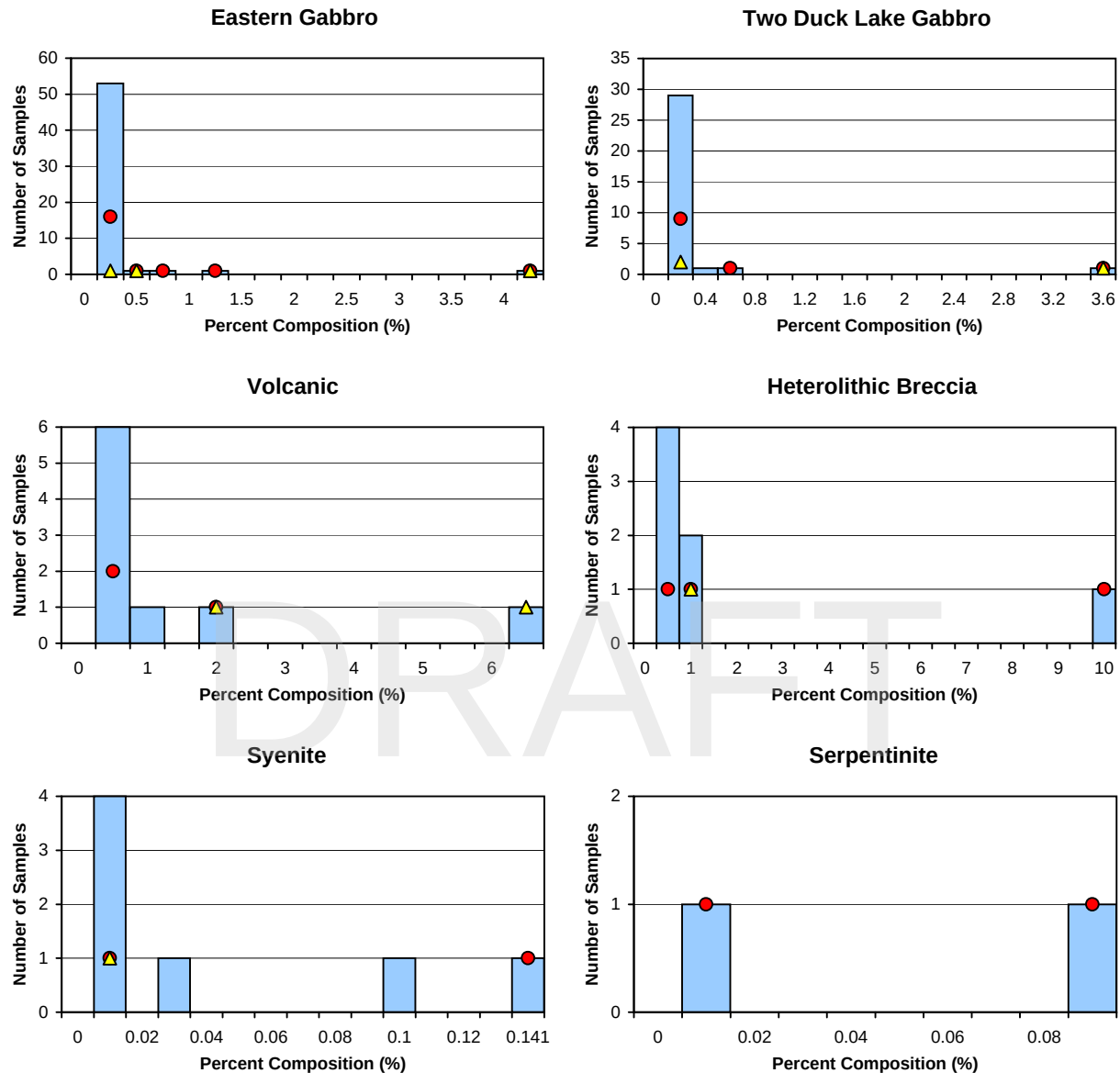
APPENDIX E

HISTOGRAMS OF BULK ELEMENTAL ANALYSIS

FIGURE E1
HISTOGRAMS OF WASTE ROCK CHEMISTRY
MARATHON PGM

07-1118-0012 (4000)

SULPHIDE CONTENT

Note:

The blue bars represent solid-phase concentrations. The red dots and the yellow triangles represent the samples selected for short-term leach and kinetic testing, respectively, for the corresponding concentration interval.

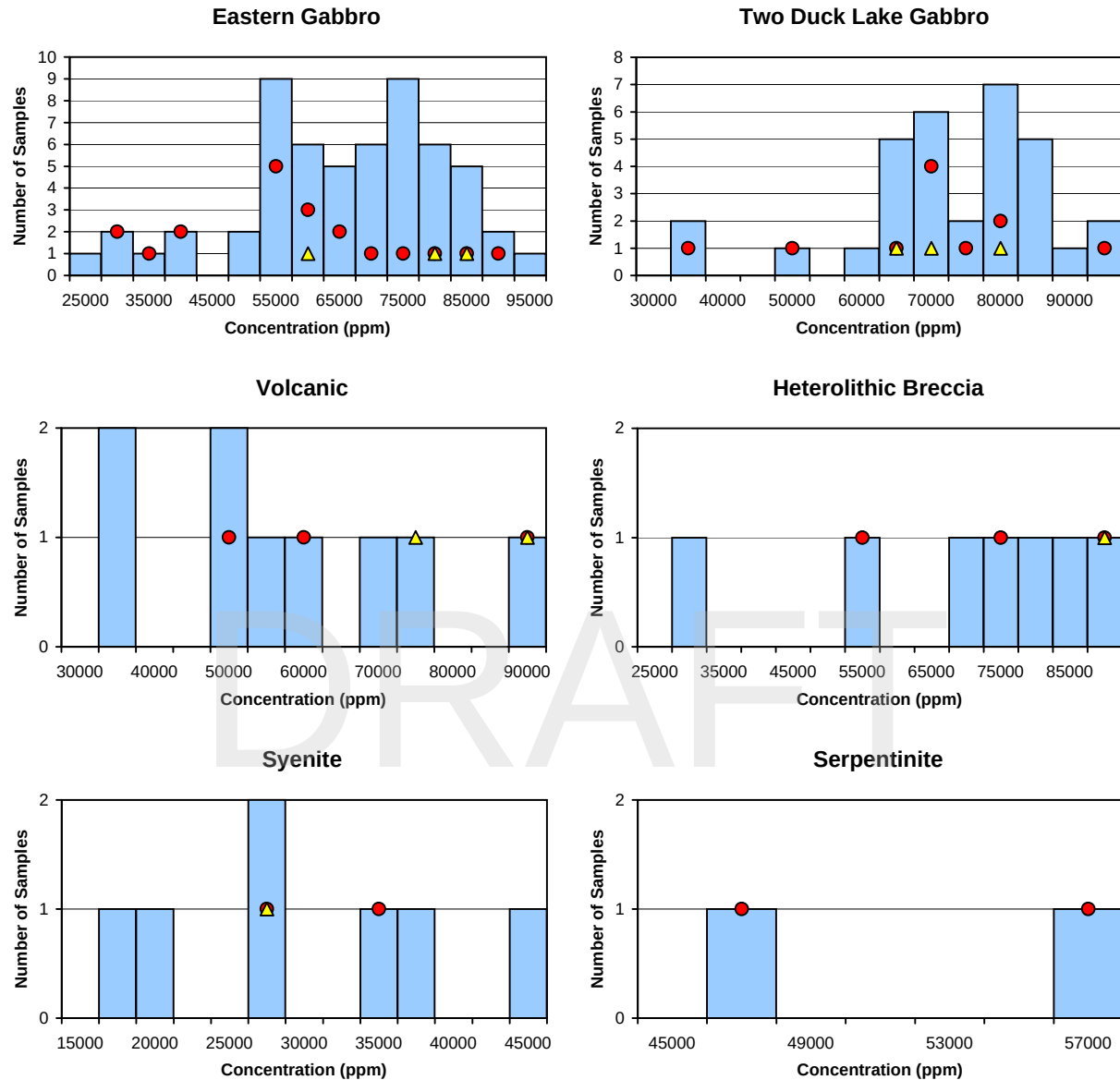
■ Solid-phase Concentrations

● Samples Selected for Leach Testing

▲ Samples Selected for Kinetic Testing

FIGURE E2
HISTOGRAMS OF WASTE ROCK CHEMISTRY
MARATHON PGM

CALCIUM



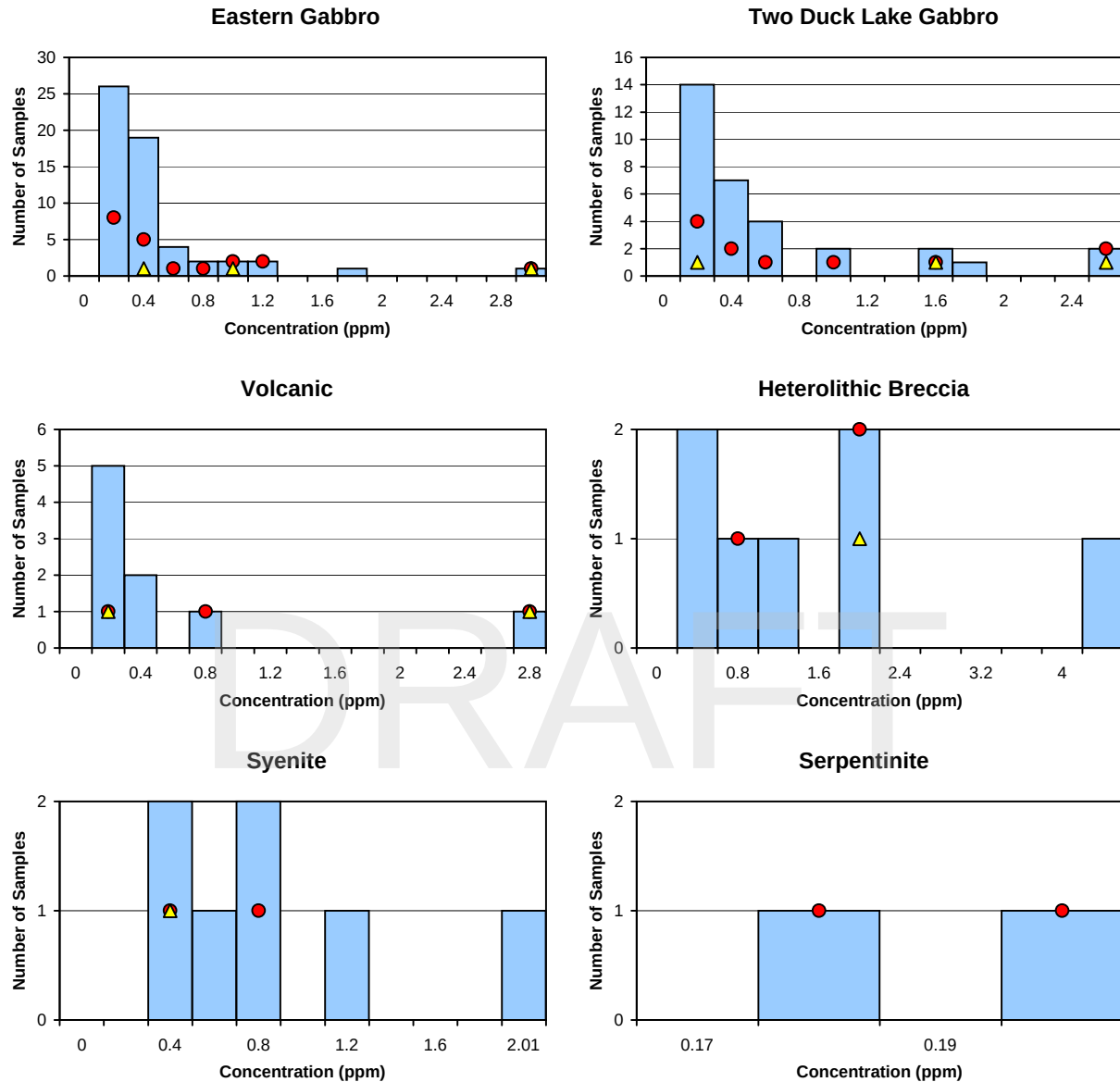
Note:

The blue bars represent solid-phase concentrations. The red dots and the yellow triangles represent the samples selected for short-term leach and kinetic testing, respectively, for the corresponding concentration interval.

- Solid-phase Concentrations
- Samples Selected for Leach Testing
- ▲ Samples Selected for Kinetic Testing

**FIGURE E3
HISTOGRAMS OF WASTE ROCK CHEMISTRY
MARATHON PGM**

SILVER



Note:

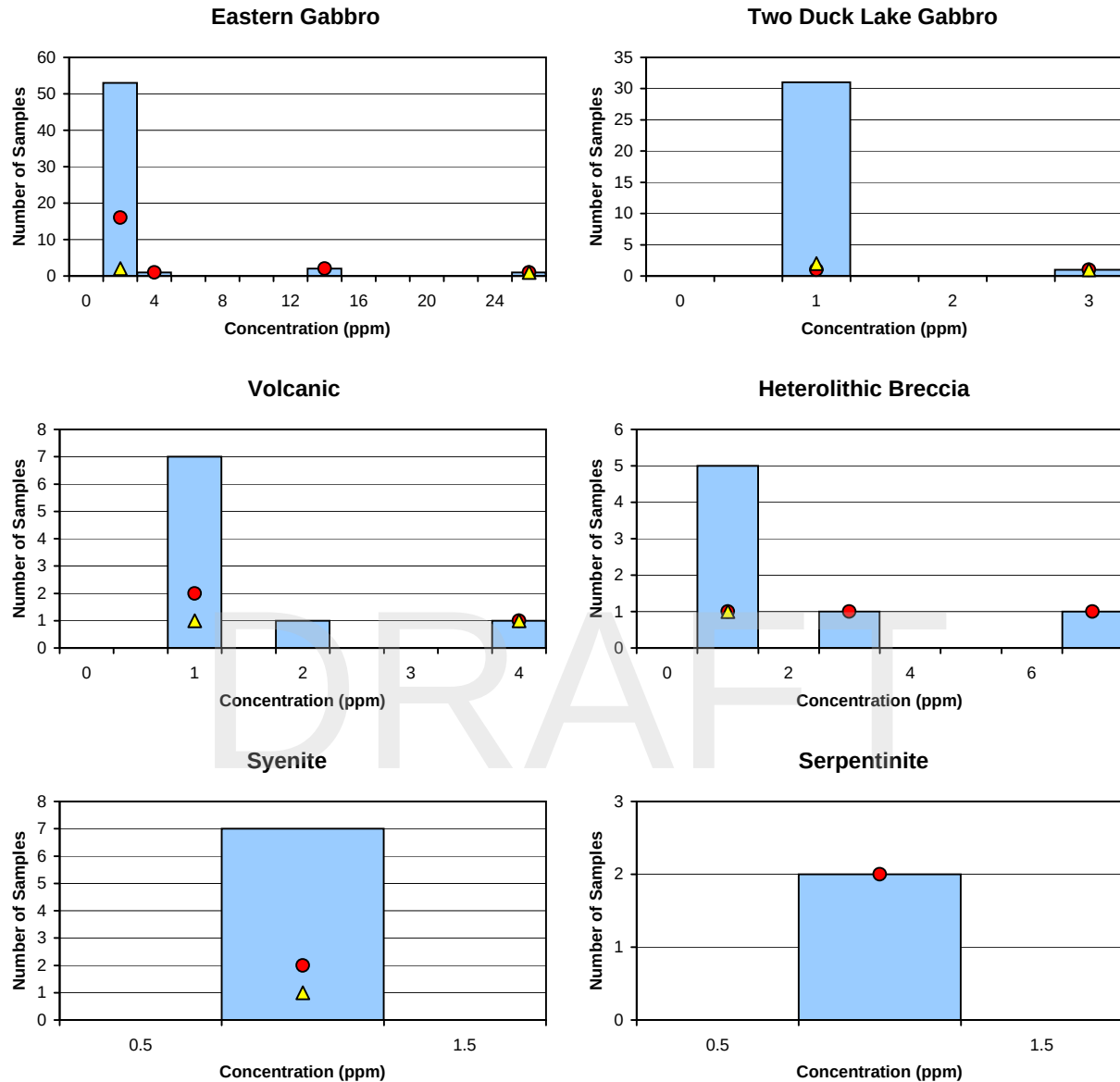
The blue bars represent solid-phase concentrations. The red dots and the yellow triangles represent the samples selected for short-term leach and kinetic testing, respectively, for the corresponding concentration interval.

- Solid-phase Concentrations
- Samples Selected for Leach Testing
- ▲ Samples Selected for Kinetic Testing

FIGURE E4
HISTOGRAMS OF WASTE ROCK CHEMISTRY
MARATHON PGM

07-1118-0012 (4000)

ARSENIC

Note:

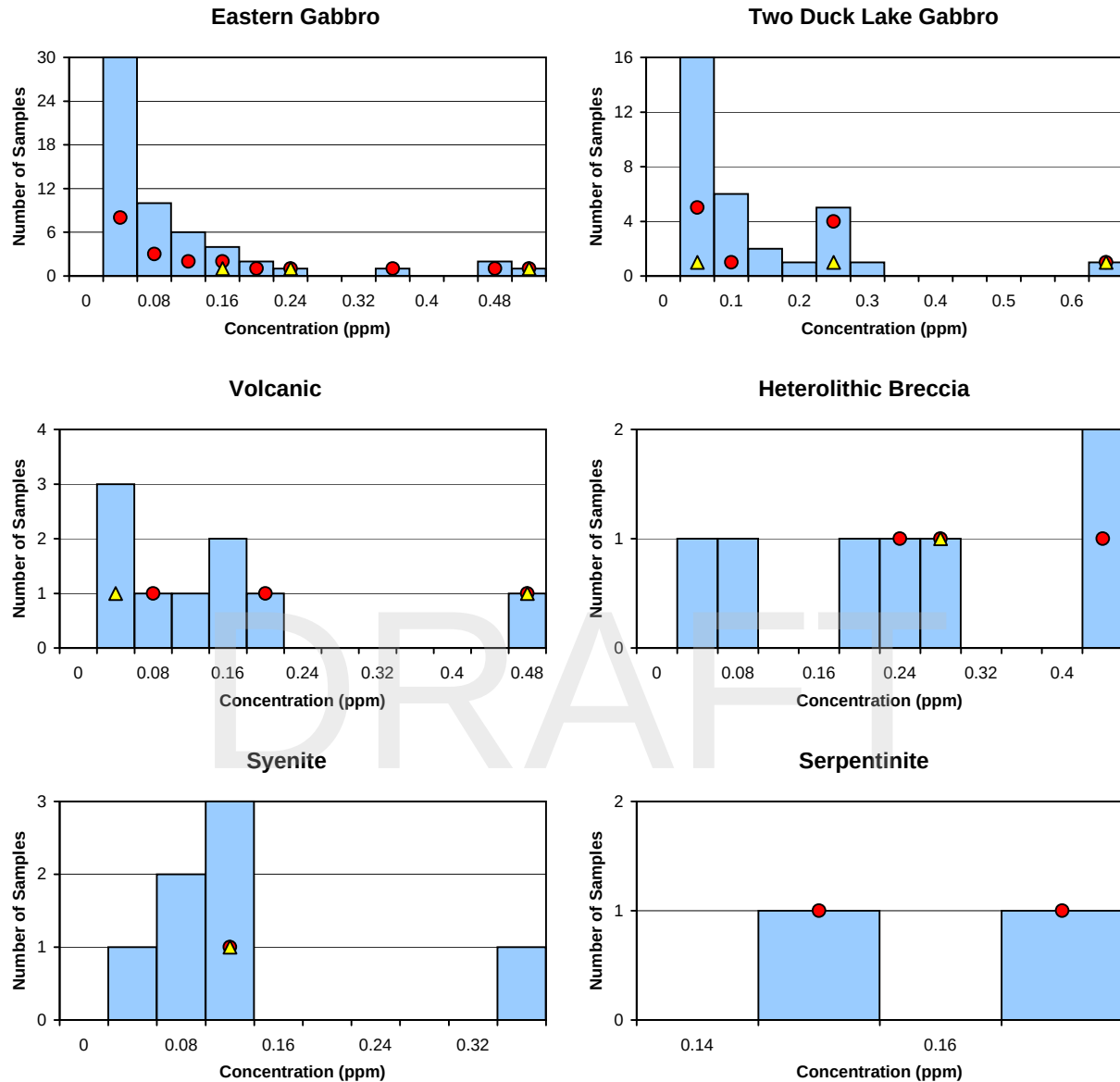
The blue bars represent solid-phase concentrations. The red dots and the yellow triangles represent the samples selected for short-term leach and kinetic testing, respectively, for the corresponding concentration interval.

- Solid-phase Concentrations
- Samples Selected for Leach Testing
- ▲ Samples Selected for Kinetic Testing

**FIGURE E5
HISTOGRAMS OF WASTE ROCK CHEMISTRY
MARATHON PGM**

07-1118-0012 (4000)

BISMUTH

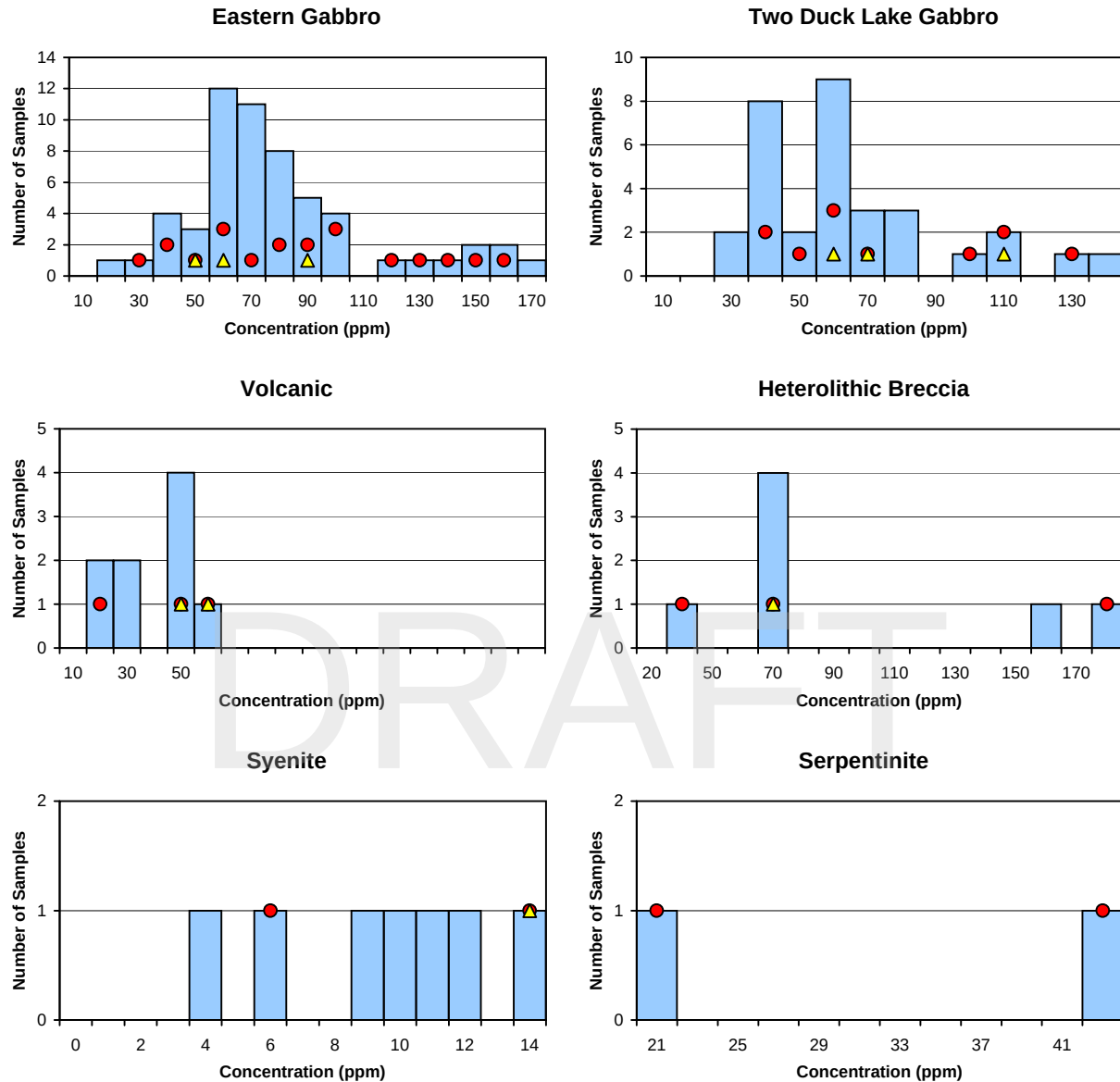
Note:

The blue bars represent solid-phase concentrations. The red dots and the yellow triangles represent the samples selected for short-term leach and kinetic testing, respectively, for the corresponding concentration interval.

- Solid-phase Concentrations
- Samples Selected for Leach Testing
- ▲ Samples Selected for Kinetic Testing

FIGURE E6
HISTOGRAMS OF WASTE ROCK CHEMISTRY
MARATHON PGM

COBALT



Note:

The blue bars represent solid-phase concentrations. The red dots and the yellow triangles represent the samples selected for short-term leach and kinetic testing, respectively, for the corresponding concentration interval.

- Solid-phase Concentrations
- Samples Selected for Leach Testing
- ▲ Samples Selected for Kinetic Testing

FIGURE E7
HISTOGRAMS OF WASTE ROCK CHEMISTRY
MARATHON PGM

07-1118-0012 (4000)

CHROMIUM

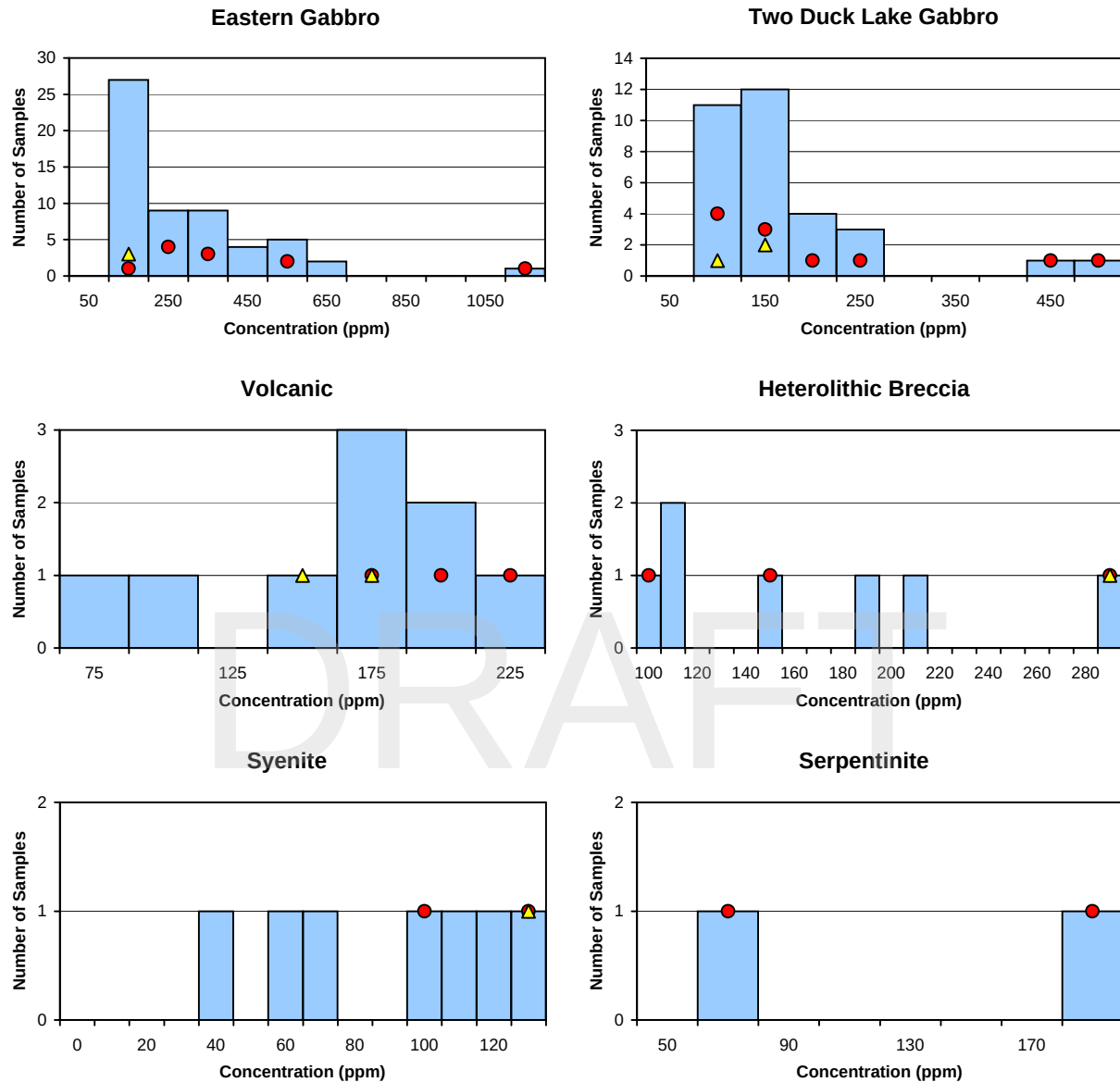
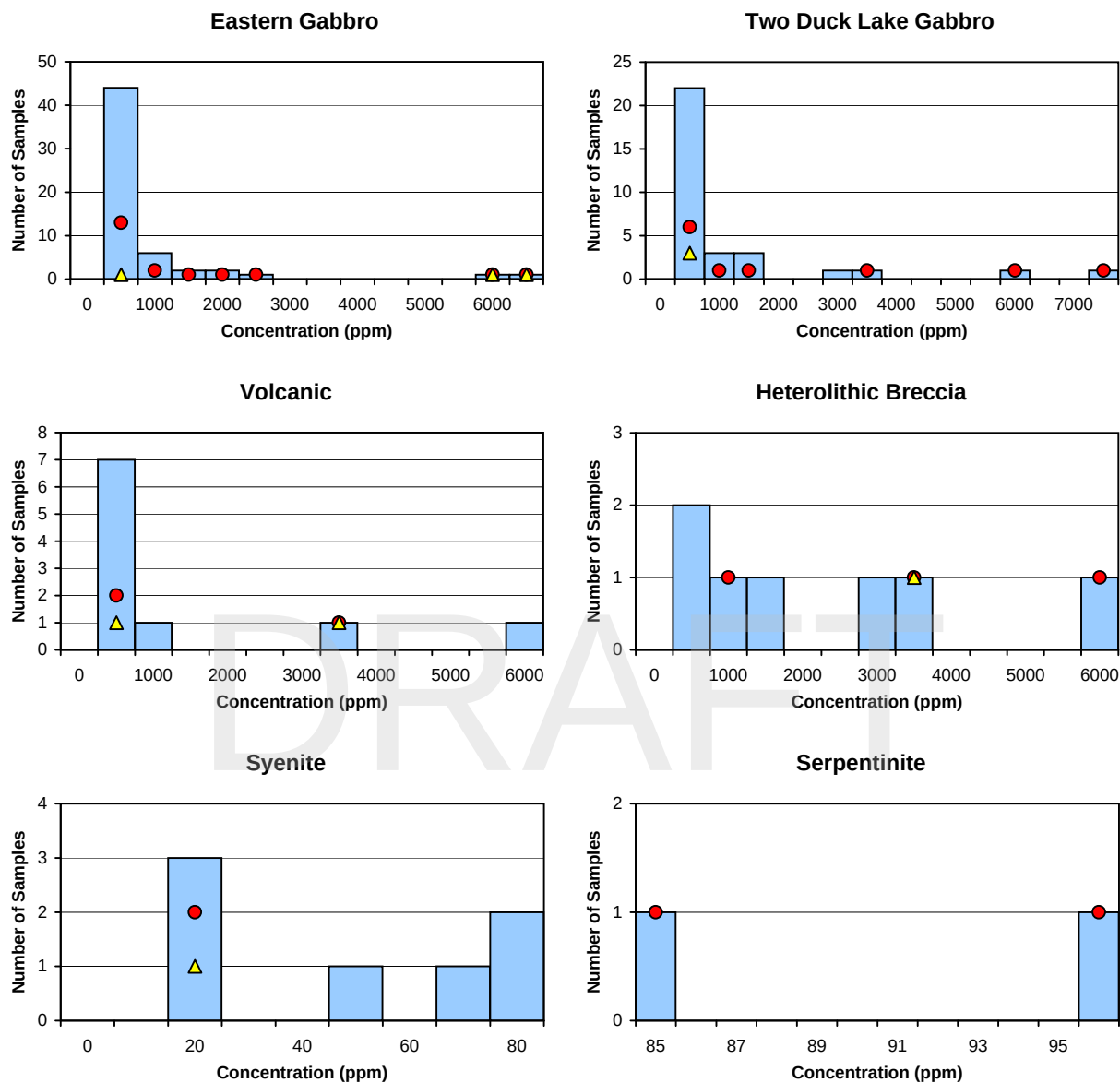


**FIGURE E8
HISTOGRAMS OF WASTE ROCK CHEMISTRY
MARATHON PGM**

07-1118-0012 (4000)

COPPER



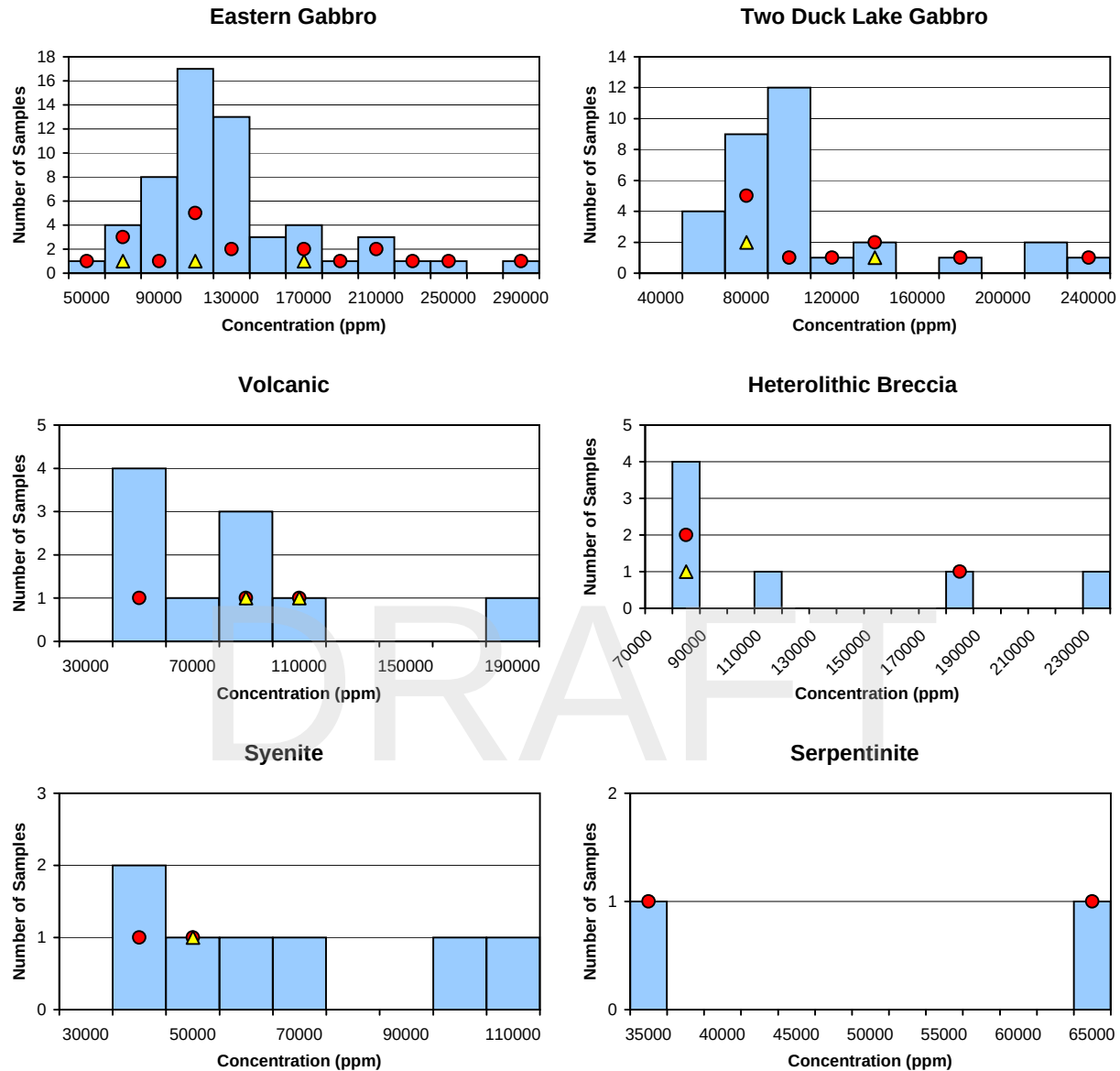
Note:

The blue bars represent solid-phase concentrations. The red dots and the yellow triangles represent the samples selected for short-term leach and kinetic testing, respectively, for the corresponding concentration interval.

- Solid-phase Concentrations
- Samples Selected for Leach Testing
- ▲ Samples Selected for Kinetic Testing

FIGURE E9
HISTOGRAMS OF WASTE ROCK CHEMISTRY
MARATHON PGM

IRON



Note:

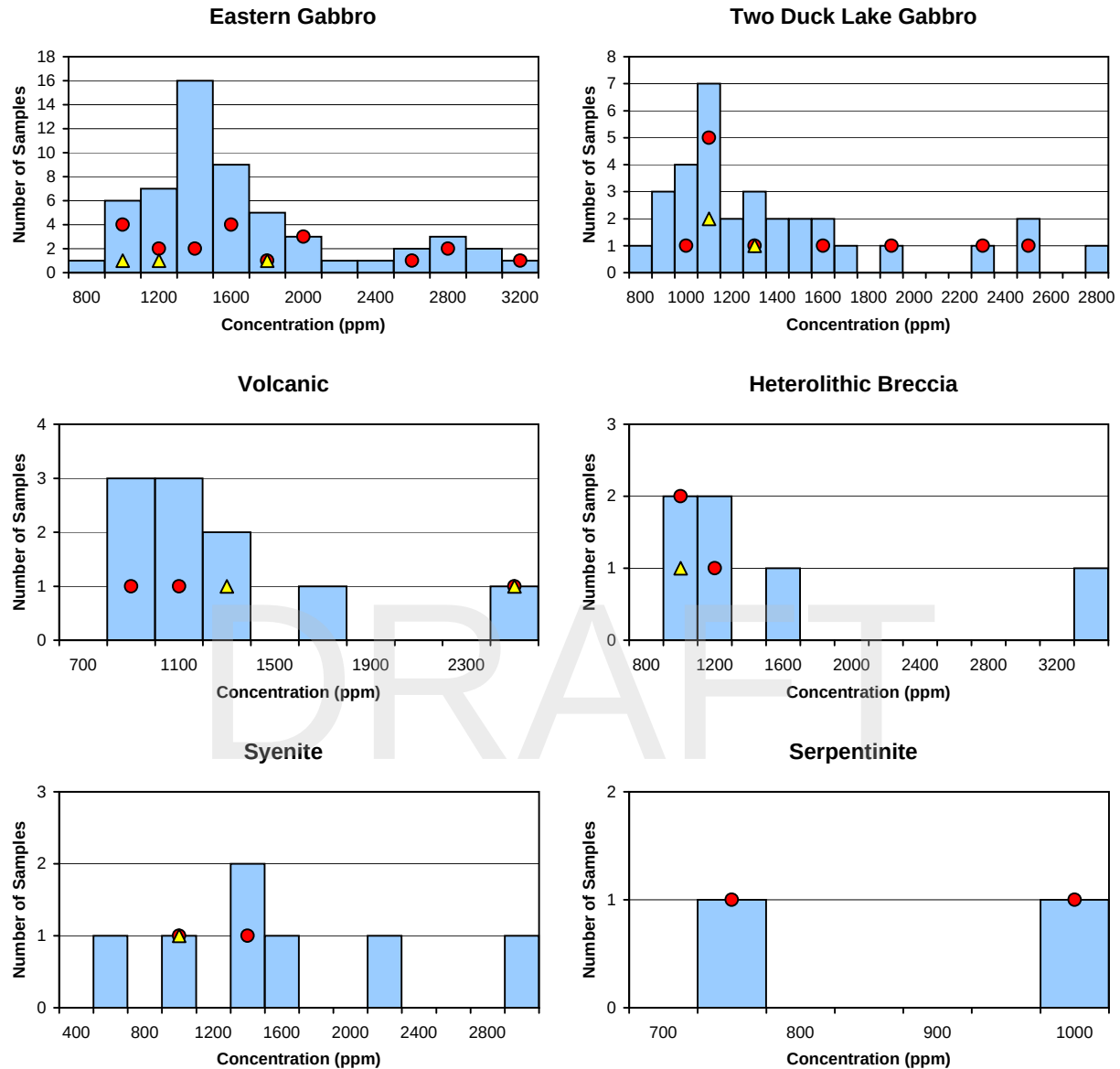
The blue bars represent solid-phase concentrations. The red dots and the yellow triangles represent the samples selected for short-term leach and kinetic testing, respectively, for the corresponding concentration interval.

- Solid-phase Concentrations
- Samples Selected for Leach Testing
- ▲ Samples Selected for Kinetic Testing

**FIGURE E10
HISTOGRAMS OF WASTE ROCK CHEMISTRY
MARATHON PGM**

07-1118-0012 (4000)

MANGANESE

Note:

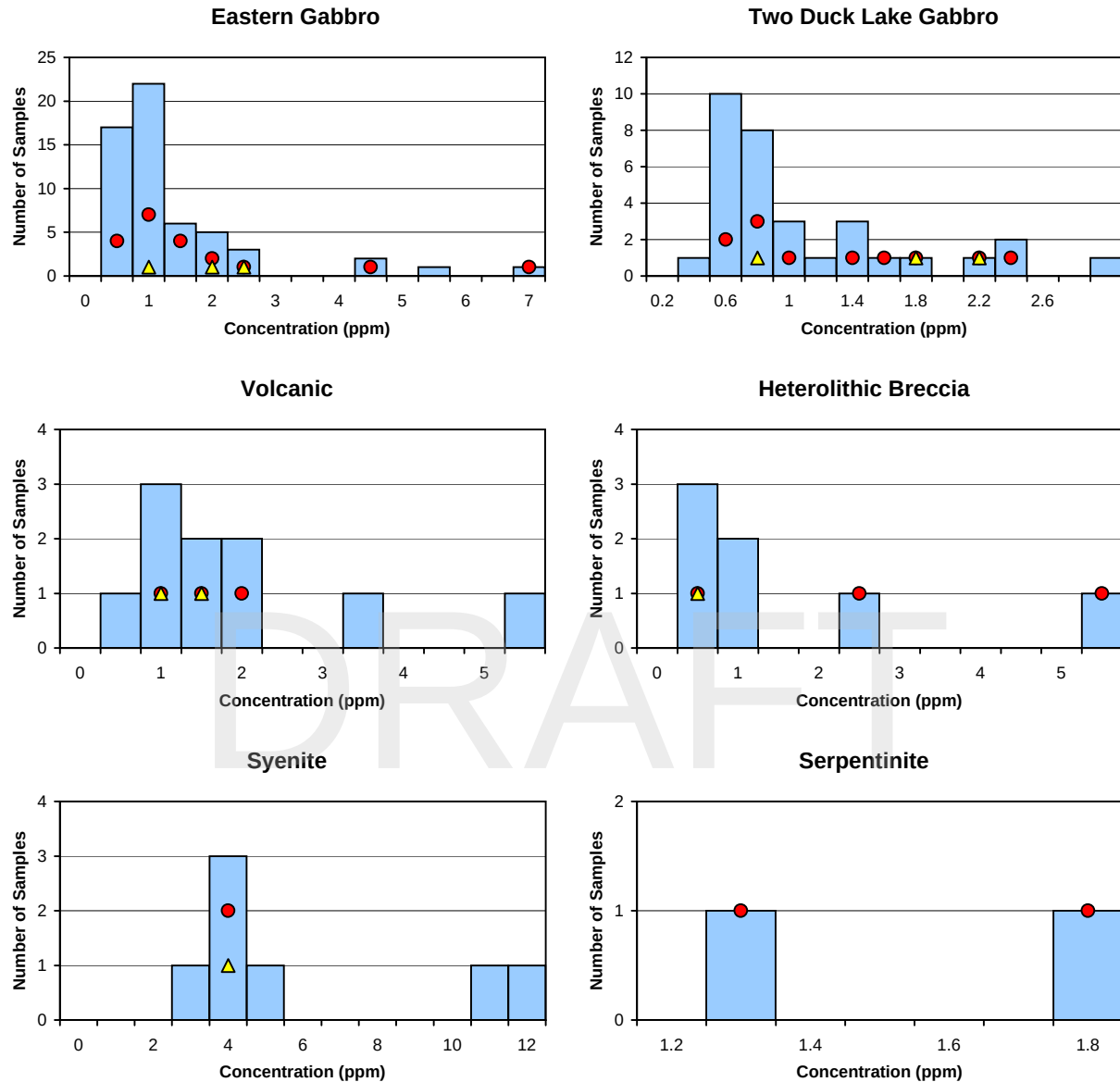
The blue bars represent solid-phase concentrations. The red dots and the yellow triangles represent the samples selected for short-term leach and kinetic testing, respectively, for the corresponding concentration interval.

- Solid-phase Concentrations
- Samples Selected for Leach Testing
- ▲ Samples Selected for Kinetic Testing

FIGURE E11
HISTOGRAMS OF WASTE ROCK CHEMISTRY
MARATHON PGM

07-1118-0012 (4000)

MOLYBDENUM

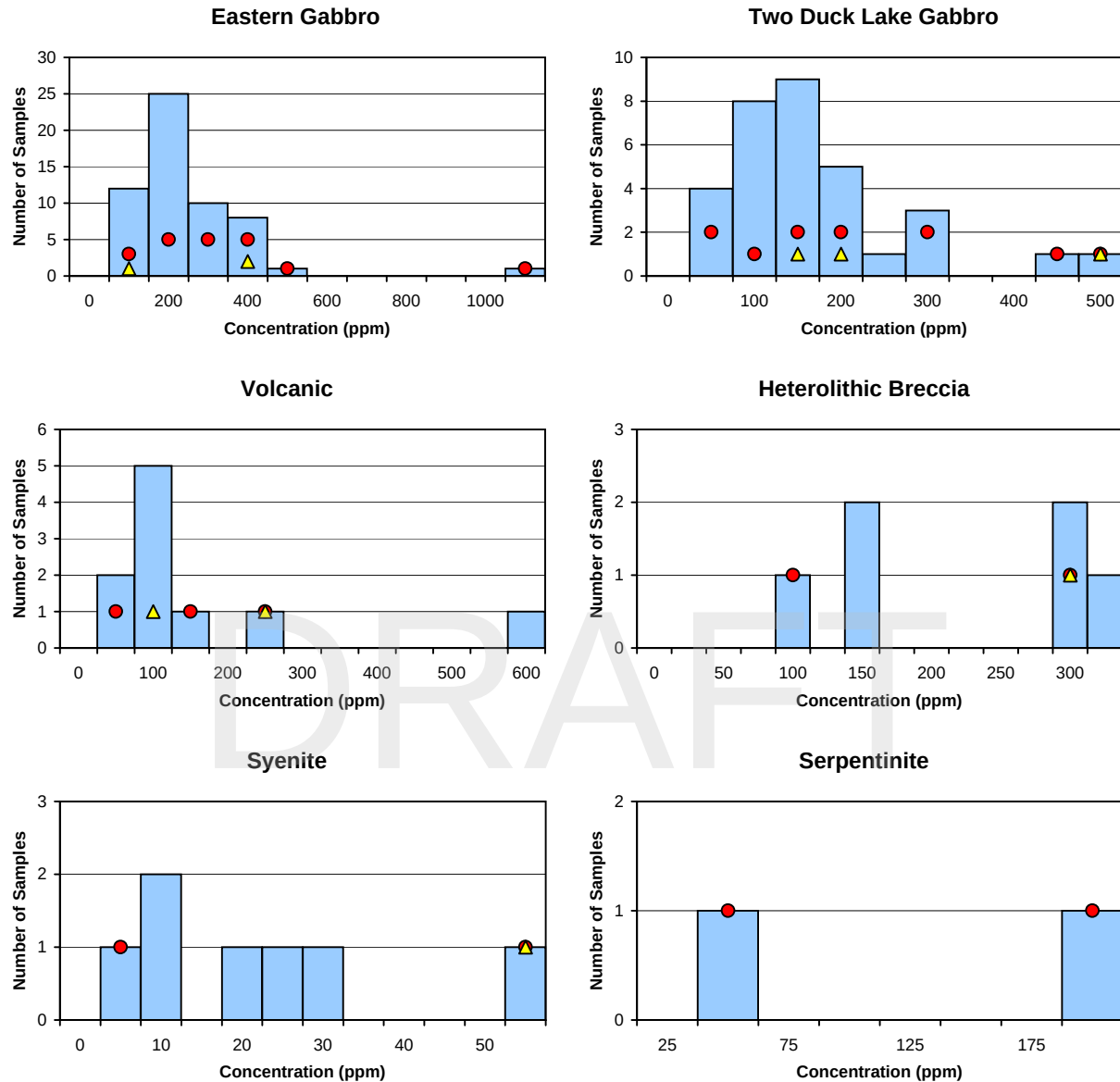
Note:

The blue bars represent solid-phase concentrations. The red dots and the yellow triangles represent the samples selected for short-term leach and kinetic testing, respectively, for the corresponding concentration interval.

- Solid-phase Concentrations
- Samples Selected for Leach Testing
- ▲ Samples Selected for Kinetic Testing

FIGURE E12
HISTOGRAMS OF WASTE ROCK CHEMISTRY
MARATHON PGM

NICKEL



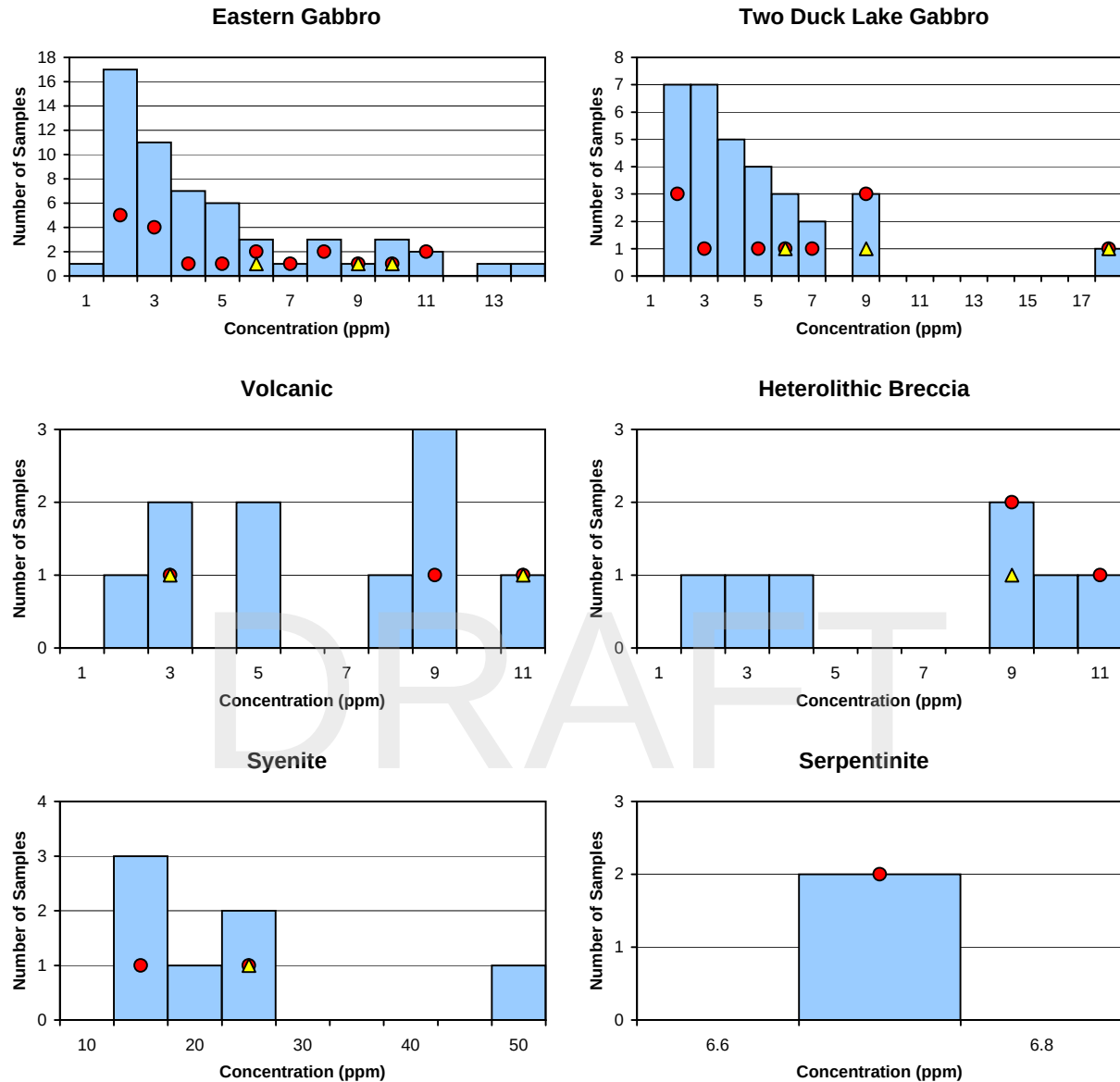
Note:

The blue bars represent solid-phase concentrations. The red dots and the yellow triangles represent the samples selected for short-term leach and kinetic testing, respectively, for the corresponding concentration interval.

- Solid-phase Concentrations
- Samples Selected for Leach Testing
- ▲ Samples Selected for Kinetic Testing

**FIGURE E13
HISTOGRAMS OF WASTE ROCK CHEMISTRY
MARATHON PGM**

07-1118-0012 (4000)

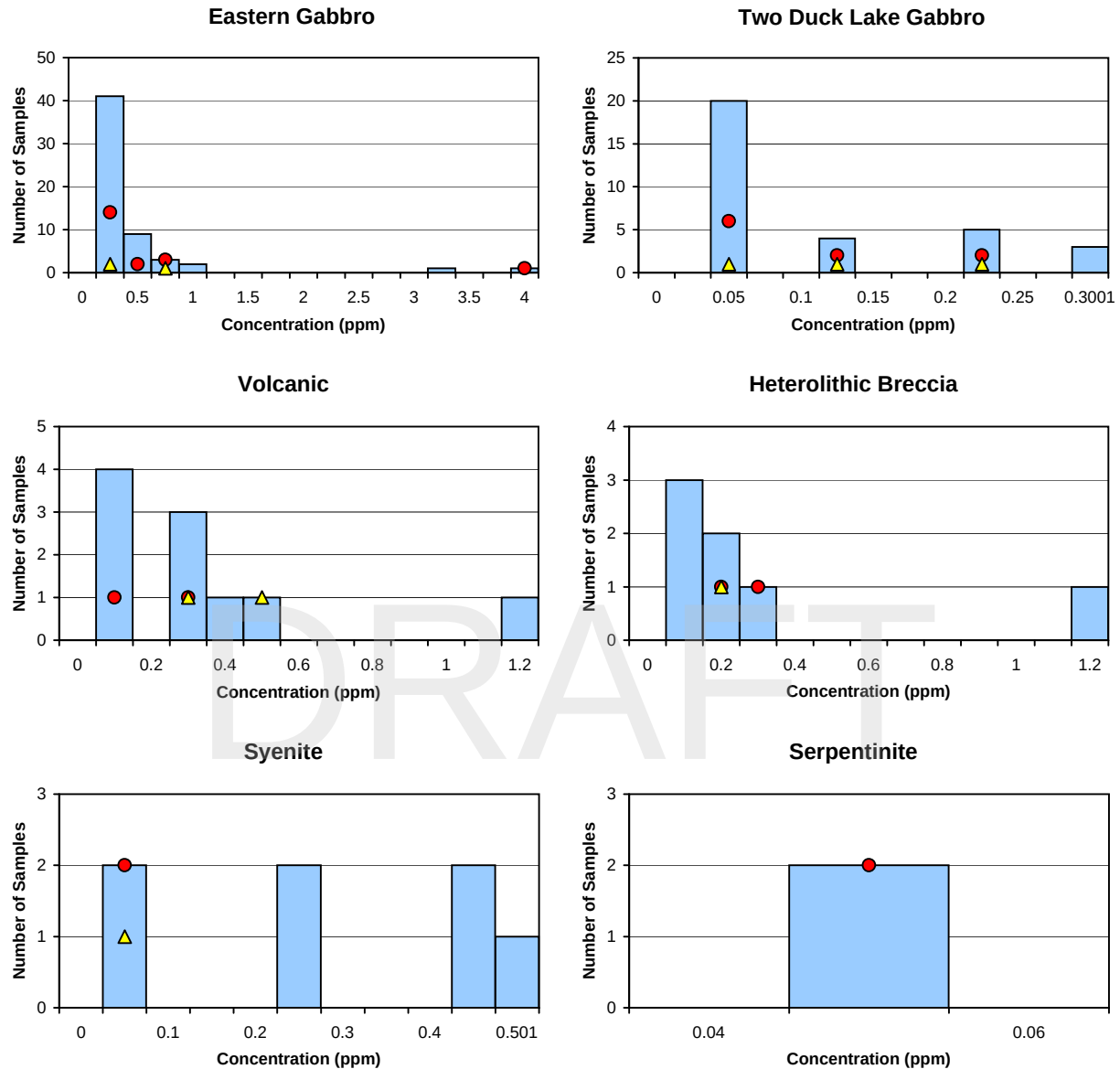
LEADNote:

The blue bars represent solid-phase concentrations. The red dots and the yellow triangles represent the samples selected for short-term leach and kinetic testing, respectively, for the corresponding concentration interval.

- Solid-phase Concentrations
- Samples Selected for Leach Testing
- ▲ Samples Selected for Kinetic Testing

FIGURE E14
HISTOGRAMS OF WASTE ROCK CHEMISTRY
MARATHON PGM

ANTIMONY



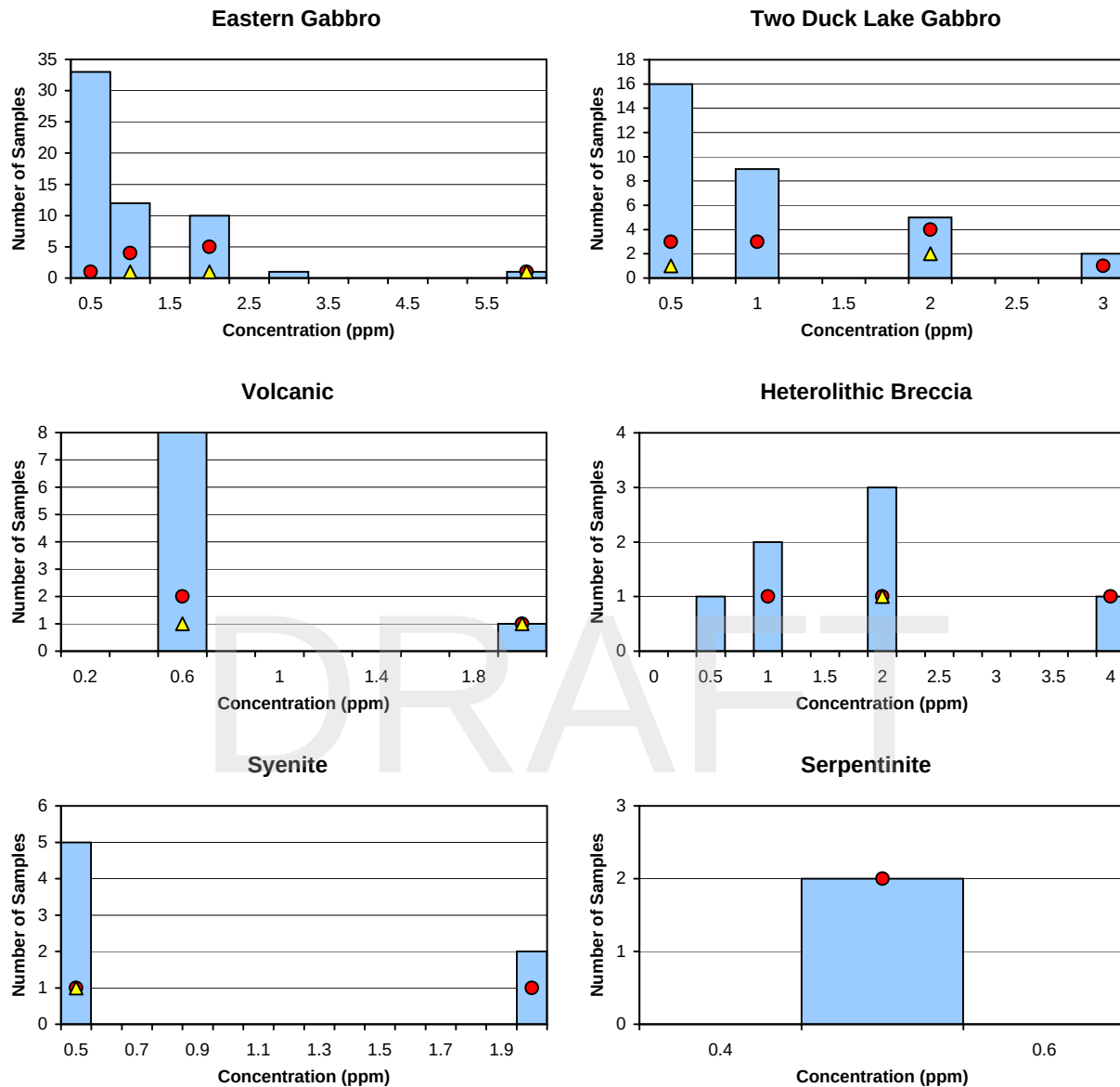
Note:

The blue bars represent solid-phase concentrations. The red dots and the yellow triangles represent the samples selected for short-term leach and kinetic testing, respectively, for the corresponding concentration interval.

- Solid-phase Concentrations
- Samples Selected for Leach Testing
- ▲ Samples Selected for Kinetic Testing

FIGURE E15
HISTOGRAMS OF WASTE ROCK CHEMISTRY
MARATHON PGM

SELENIUM



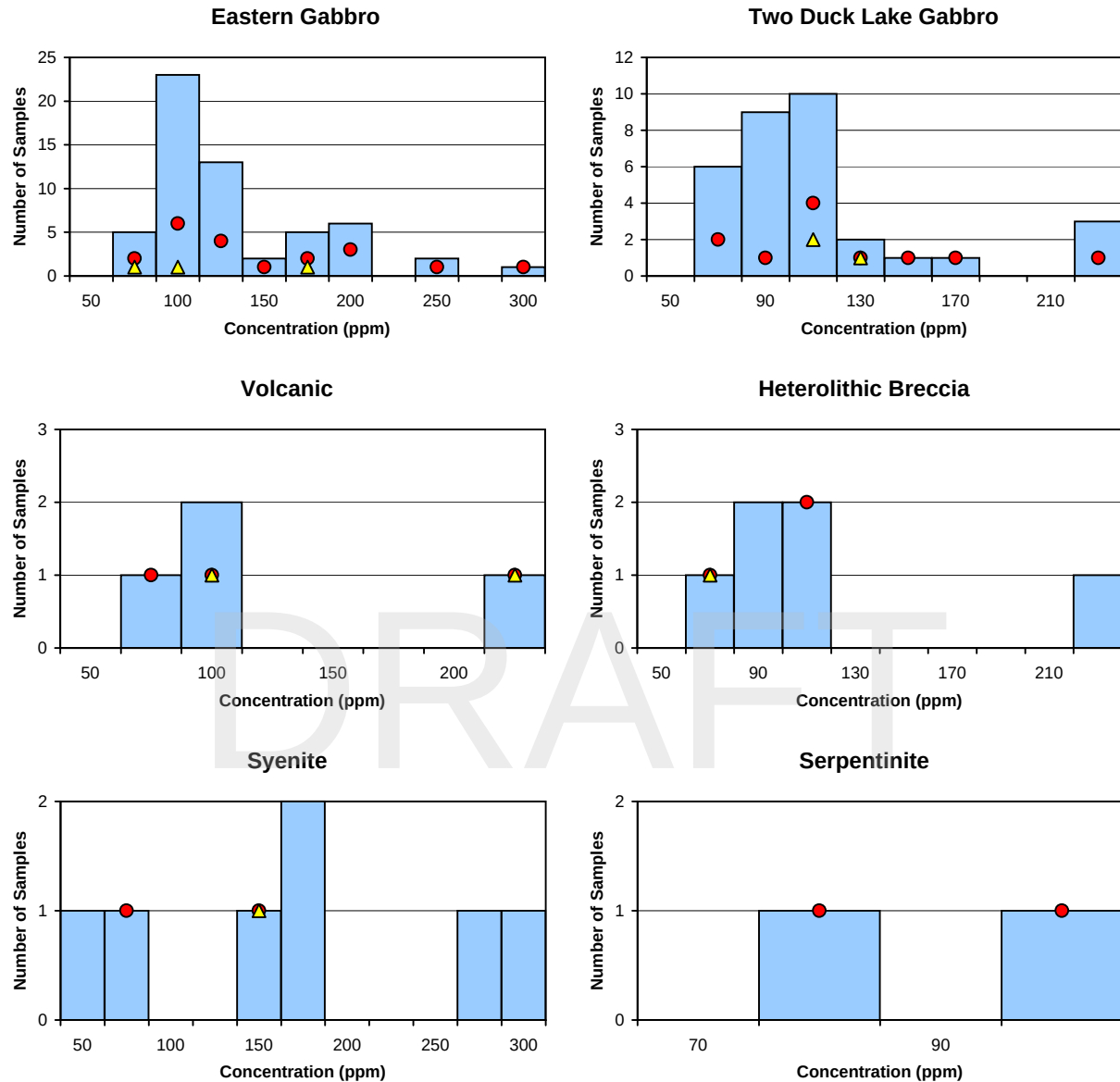
Note:

The blue bars represent solid-phase concentrations. The red dots and the yellow triangles represent the samples selected for short-term leach and kinetic testing, respectively, for the corresponding concentration interval.

- Solid-phase Concentrations
- Samples Selected for Leach Testing
- ▲ Samples Selected for Kinetic Testing

FIGURE E16
HISTOGRAMS OF WASTE ROCK CHEMISTRY
MARATHON PGM

ZINC



Note:

The blue bars represent solid-phase concentrations. The red dots and the yellow triangles represent the samples selected for short-term leach and kinetic testing, respectively, for the corresponding concentration interval.

- Solid-phase Concentrations
- Samples Selected for Leach Testing
- ▲ Samples Selected for Kinetic Testing

APPENDIX F

**PROVINCIAL WATER QUALITY OBJECTIVES
AND
MUNICIPAL/INDUSTRIAL STRATEGY FOR
ABATEMENT DISCHARGE LIMITS**

**PROVINCIAL WATER QUALITY OBJECTIVES AND MISA EFFLUENT DISCHARGE LIMITS
MARATHON PGM-Cu**

Parameter	Units	Provincial Water Quality Objectives ⁽¹⁾	MISA Effluent Discharge Limits ⁽²⁾
pH	units	6.5 – 8.5	–
Ag	mg/L	0.0001	–
Al	mg/L	0.015 – 0.075 ⁽³⁾	–
As	mg/L	0.005	0.5
B	mg/L	0.2	–
Ba	mg/L	–	–
Be	mg/L	0.011 – 1.1 ⁽⁴⁾	–
Bi	mg/L	–	–
Cd	mg/L	0.0001 – 0.0005 ⁽⁵⁾	–
Co	mg/L	0.0009	–
Cr	mg/L	0.001 ⁽⁶⁾	–
Cu	mg/L	0.001 – 0.005 ⁽⁷⁾	0.3
Fe	mg/L	0.3	–
Hg	mg/L	0.0002	–
Li	mg/L	–	–
Mn	mg/L	–	–
Mo	mg/L	0.04	–
Ni	mg/L	0.025	0.5
Pb	mg/L	0.001 – 0.005 ⁽⁸⁾	0.2
Sb	mg/L	0.02	–
Se	mg/L	0.1	–
Sn	mg/L	–	–
Sr	mg/L	–	–
Ti	mg/L	–	–
Tl	mg/L	0.0003	–
U	mg/L	0.005	–
V	mg/L	0.006	–
Zn	mg/L	0.02	0.5

Notes:

(1) MOEE [Ontario Ministry of Environment and Energy], 1994. Policies Guidelines Provincial Water Quality Objectives. Reprinted 1999.

(2) MISA [Municipal/Industrial Strategy for Abatement] (1994). Ontario Regulation 560/94, Effluent Monitoring and Effluent Limits – Metal Mining Sector.

(3) PWQO for Al depends on pH as follows: pH = 4.5–5.5, PWQO = 0.015 mg/L; pH >5.5–6.5, PWQO = 10% of background concentration; pH >6.5–9.0, PWQO = 0.075 mg/L.

(4) PWQO for Be depends on hardness as follows: hardness <75 mg/L as CaCO₃, PWQO = 0.011 mg/L; hardness >75 mg/L as CaCO₃, PWQO = 1.1 mg/L.

(5) PWQO for Cd depends on hardness as follows: hardness 0–100 mg/L as CaCO₃, PWQO = 0.0001 mg/L; hardness >100 mg/L as CaCO₃, PWQO = 0.0005 mg/L.

(6) PWQO for Cr is based on either: hexavalent chromium [Cr (VI)], PWQO = 0.001 mg/L; or trivalent chromium [Cr (III)], PWQO = 0.0089 mg/L. Conservatively, it is assumed that all Cr is present as Cr (VI).

(7) PWQO for Cu depends on hardness as follows: hardness 0–20 mg/L as CaCO₃, PWQO = 0.001 mg/L; hardness >20 mg/L as CaCO₃, PWQO = 0.005 mg/L.

(8) PWQO for Pb depends on hardness as follows: hardness <30 mg/L as CaCO₃, PWQO = 0.001 mg/L; hardness = 30–80 mg/L as CaCO₃, PWQO = 0.003 mg/L; hardness >80 mg/L as CaCO₃, PWQO = 0.005 mg/L.

Golder Associates