Tropicana Gold Project

Geochemical Characterisation of Waste Rock and Low Grade Ore Static and Kinetic testing

Report Prepared for

Tropicana Joint Venture

Prepared by

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Geochemical Characterisation of Waste Rock and Low Grade Ore Static and Kinetic testing

Report prepared for:

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On behalf of:

Tropicana Joint Venture

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Executive Summary

The proposed Tropicana Gold Project (TGP) is a Joint Venture between AngloGold Ashanti Australia (AGAA; 70%, Manager) and the Independence Group (IG; 30%). As part of the pre-feasibility study SRK was commissioned to assess the potential for waste material associated with the Tropicana and Havana deposits to generate acid run-off or drainage. The requirements of the project were to specify which material could cause potential concerns and issues, provide guidance for waste management requirements and form the basis for a future assessment and monitoring.

This report documents the findings of the geochemical characterisation tests carried out on samples representative of waste material from the TGP. The geochemical investigation comprised both static and kinetic test procedures.

The geochemical investigation was carried out in two phases. The first phase programme was designed to identify lithologies that may produce acid and those that may consume acid, and to assess the overall variability of acid generation potential (i.e. sulphide minerals) and acid neutralisation capacity in the lithological units. In the second phase, additional samples were submitted for static testing to improve the acid generation potential and acid neutralisation capacity classification of some samples and rock types. Samples were also selected and subjected to kinetic testing procedures to establish the potential acid generation and metal leach rates that may occur within the waste landform.

A total of 148 samples comprising 133 waste material and 15 low grade ore samples were assessed for their acid generation properties. Assessment of the relative abundance of each lithological unit showed a sampling bias toward sulphide mineralisation and therefore acid generation potential may be overestimated. Overall, about 97.2 % of the waste material types were represented in the sampling program.

The static test parameters and measurement procedures included paste pH and paste Electrical Conductivity (EC), total sulphur, sulphate sulphur, total carbon/total inorganic carbon (TIC), acid neutralising capacity (ANC), net acid generation (NAG), whole rock chemical assay, acid buffering characteristic curve (ABCC) and kinetic NAG tests. The kinetic test program comprised modified AMIRA type column tests procedures.

The results suggest that the available neutralisation potential is best indicated by the carbonate equivalent NP (CarbNP) calculated from the inorganic carbon content and should be used for material classification. The results further suggest that while not all of the sulphide minerals may be equally reactive, most if not all appears to be available for acid generation.

The results suggest that about 70 – 75 % of waste material is expected to be non acid forming. About 8 % of the waste material is expected to potentially acid forming, but could be as high as 15 %. The potentially acid generating lithologies include the ferruginous chert (ANC_{RT}), feldspathic gneiss (undifferentiated) (ANFF), the pegmatites (APP), the sulphide rich rock (AX), and the schists. The acid generating properties of about 10 to 22 % of the waste material is classified as 'uncertain'. Further characterization of the materials that classify as uncertain is required, ideally through kinetic testing, to determine their potential for acid generation.

At the time of writing the kinetic tests have progressed through 32 cycles (weeks) of testing. Steady state conditions have not yet been established for the tests and they are ongoing. Nevertheless, the results indicate a clear difference in oxidation rates amongst the different samples, and appear to be correlated to pH and sulphide mineral content.

As with the oxidation rates, the solute release rates have not yet stabilised. The results to date indicate that aluminium and copper release rates are pH related and increase with decreasing pH. Arsenic release occurs at near neutral pH conditions and is highest rate occurs in the non acid forming test. Manganese release is variable and is pH related.

To convert the kinetic release data to water quality predictions for the landform, it is necessary to understand the rate of infiltration to the landform. While no site specific data are available for determining infiltration rates, based on published waste material landform net infiltration rates, we estimated that the infiltration would be less than 6% of mean annual rainfall. In the longer term it is reasonable to conclude that preferential placement of suitable material combined with trafficking could reduce net infiltration to close to regional recharge rates which are in the order of 1 % or less of mean annual precipitation. Due to preferential flow seepage events could however occur occasionally.

Seepage quality from the landform was estimated for an upper bound and a lower bound case. Overall the waste material has a net excess of neutralization capacity which suggests that, if managed appropriately, neutral pH conditions could be maintained as a whole. It is possible however that localised some areas of acid conditions could exist. Using the kinetic test solute release rates the water quality estimates were as follows:

Parameter	Concentration (mg/L)	
	Upper Bound	Lower Bound
SO4	42,618	2523
Al	238	11
Sb	0.79	0.076
As	14	13
Cd	2.3	0.30
Co	61	0.59
Cu	18	6.6
Fe	8,210	7.4
Pb	4.6	3.4
Mo	6.2	0.69
Ni	19	7.4
Se	4.6	3.7
Zn	119	14
Ca	450	500
Mg	3,153	326

In the case of the lower bound estimate it is almost certain that neutral conditions could be maintained and the pH would be buffered to about 7, in which case the concentrations of a number of parameters would be lower than estimated as their solubility would be limited by the formation of secondary minerals. For example, as indicated by preliminary MINTEQA2 geochemical modelling, the concentration of aluminium would decrease to about 1 mg/L, copper to less than 0.5 mg/L due to the formation of hydroxide minerals. Lead solubility would be limited by the formation of lead sulphate. Furthermore, under oxidising and neutral pH conditions, the iron could oxidise to form iron oxy-hydroxides and its concentration could decrease to about 0.3 mg/L or less. The formation of the oxy-hydroxides could further lead to the adsorption or co-precipitation of elements such as nickel, molybdenum and arsenic.

The preliminary upper and lower bound concentration estimates may be used to assess potential impacts on groundwater quality. Since non-reactive materials will be used to place the proposed cover over the waste material landform, surface run-off water quality should not be impacted

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Disclaimer

The opinions expressed in this Report have been based on the information supplied to SRK Consulting (Australasia) Pty Ltd (SRK) by AngloGold Ashanti Australia and Genalysis Analytical Laboratories. The opinions in this Report are provided in response to a specific request from AngloGold Ashanti to do so. SRK has exercised all due care in reviewing the supplied information. Whilst SRK has compared key supplied data with expected values, the accuracy of the results and conclusions from the review are entirely reliant on the accuracy and completeness of the supplied data. SRK does not accept responsibility for any errors or omissions in the supplied information and does not accept any consequential liability arising from commercial decisions or actions resulting from them.

Glossary of Terms

Term	Definition
ABCC	Acid buffering characteristic curve
ANC_{RT}	Lithology code for ferruginous chert
AP	Acid potential calculated based on all non sulphate sulphur being present as pyrite (kgH_2SO_4/tonne)
ARD	Acid rock drainage
CarbNP	Carbonate neutralisation potential estimated from the measured inorganic carbon concentration and assuming all carbon is present as carbonate (CO_3) (kgH_2SO_4/tonne)
DD	Diamond drilling
EC	Electrical conductivity
GAI	Global abundance index
ICP-MS	Inductively coupled plasma mass spectrometry
ICP-OES	Inductively coupled optical emission spectroscopy
kg	kilogram
m	metre
MPA	Maximum potential acidity calculated assuming that all sulphur is present as pyrite (kgH_2SO_4/tonne)
NAF	Non acid forming - a classification in regard to potential for rock to be acid forming
NAG	Net acid generation (kgH_2SO_4/tonne)
NAPP	Net acid producing potential (kgH_2SO_4/tonne)
NP	Acid neutralising capacity (NP has been adopted rather than ANC to avoid confusion with the lithological descriptors) (kgH_2SO_4/tonne)
NPR	Net Potential Ratio
PAF	Potentially acid forming - a classification in regard to potential for rock to be acid forming
PAF-LC	Potentially acid forming and of low capacity to produce acid
PFS	Prefeasibility study
pH	Negative logarithm of the concentration of hydrogen ions
RC	Reverse circulation drilling
UC	Uncertain – a classification in regard to potential for rock to be acid forming

Notes:

The nomenclature of the periodic table is used for abbreviations of the elements. Nomenclature for various lithologies in the Havana and Tropicana zones is given in Table 2.1

1 Introduction

1.1 Terms of Reference

The proposed Tropicana Gold Project (TGP) is a Joint Venture between AngloGold Ashanti Australia (AGAA; 70%, Manager) and the Independence Group (IG; 30%). The proposed project includes the development of open-cut pits, waste material landforms, a processing plant and associated tailings storage facility.

AngloGold Ashanti Australia engaged SRK Consulting (Australasia) Pty Ltd (SRK) on behalf of the Tropicana Joint Venture to assess the potential for acid mine drainage from waste material that will be produced at the proposed Tropicana mine. The requirements were specifically for a pre-feasibility level assessment that would identify potential concerns and issues, provide guidance for waste management requirements and form the basis for a future assessment that would support the feasibility study. Findings from the assessment will be incorporated into a Pre-Feasibility Study (PFS) and used in the Environmental Assessment process.

1.2 Background

1.2.1 Project Location

The TGP is located 330 km east north-east of Kalgoorlie, Western Australia. A location map is provided in Figure 1.1. The gold deposit is hosted in metamorphic rocks that form the eastern margin of the Yilgarn Craton. The Joint Venture area comprises leases covering approximately 13,000 square kilometres. The Tropicana deposit (including the Tropicana and Havana zones), at the northern end of the leases, was discovered in 2005.

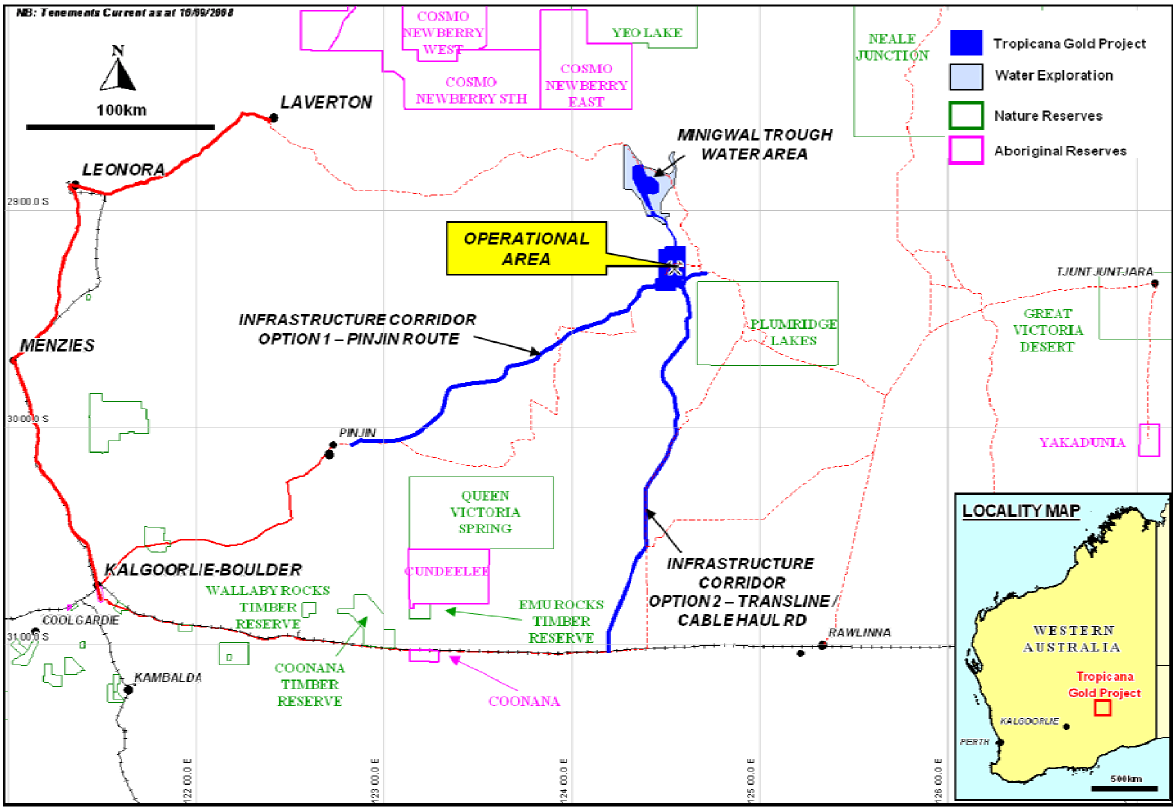

Figure 1.1 General Location of the Tropicana Gold Project

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1.2.2 Environment

The TGP is situated on the edge of the Great Victoria Desert. The Great Victoria Desert is an active sandridge desert of deep Quaternary aeolian sands with a tree steppe of Marble Gum (*Eucalyptus gongylocarpa*), Mulga and Ooldea Mallee (*E. youngiana*) over hummock grassland, dominated by Hard Spinifex (*Triodia basedowii*).

The climate is arid, with average daily temperature ranges of 15-45°C in summer and 0-30°C during winter. Rainfall generally comprises scattered showers during the winter months, and seasonal thunderstorms and cyclone-related events during the summer months. The rainfall averages between 150-250 mm annually, falling predominantly between December and June.

1.2.3 Geological Setting

From a geological perspective, Tropicana is distinct from the Archaean greenstone-hosted gold deposits in the Yilgarn region and is different to any other gold discoveries in Australia. Exploration work indicates the mineralisation is hosted within high-grade gneissic rocks and is associated with late biotite and pyrite alteration.

It comprises two known mineralised zones; the Tropicana zone to the north and the Havana zone to the south. Gold grades exceeding 1 gram per tonne (g/t) have been defined over a strike length of greater than 4 kilometres (km).

The Tropicana and Havana mineralised zones comprise multiple lenses that thin and thicken along strike and down dip. Lenses comprise patchy disseminations, veins, and crackle breccia-hosted pyrite. Pyrite is fine-grained (< 0.2mm) and typically occurs at an abundance of 2 to 8% in the mineralised intervals. Other sulphide minerals include subordinate pyrrhotite, trace chalcopyrite and rare galena, sphalerite and bornite.

Outside the mineralised and sheared zones, the alteration mineralogy is strongly controlled by the pre-existing metamorphic mineralogy (garnet, amphibole, biotite, quartz, feldspar, pyroxene) and comprises various assemblages of sericite, chlorite, epidote, and calcite. Calcite is widespread but subordinate and of weak intensity. Calcite-chlorite veins (< 1mm across) are widespread through the core and are typically spaced 0.5 to 3 metres (m) apart.

As of June 2007, 567 RC and DD holes had been completed. Drilling had been spaced on a grid of approximately 50m x 50m. Multi-element analyses had been conducted on sample from 11 holes intersecting the hanging wall, ore zone and footwall rocks. The metallurgical test programme included trace element analyses of the drill cores from the ore zone within 25 holes. Since June 2007, 1241 additional holes have been drilled within the proposed Tropicana / Havana Resource Area for a total of 1808 holes.

1.3 Report Scope

This report documents the findings of the geochemical characterisation tests carried out on samples representative of waste material from the TGP. The geochemical investigation comprised both static and kinetic test procedures. The scope of the geochemical testing programme is presented in Chapter 2 of this report. Chapter 3 presents and discusses the outcomes of the geochemical investigation. Chapter 4 presents a discussion of proposed waste material disposal and management strategies and the expected effects on water quality that may percolate from the proposed waste material landforms. Conclusions and recommendations are provided in Chapter 5.

2 Geochemical Investigation Programme

2.1 Overview

The geochemical investigation was carried out in two phases.

In the first phase, the geological information made available by TGP, comprising the drill hole database together with logging data (lithology and geologist's estimate of sulphide mineralisation) was reviewed. Specific emphasis was placed on developing an understanding of the occurrence of sulphide and carbonate minerals within the ore deposit and the adjacent lithologies that would contribute to the waste material. Sample selection for analysis and geochemical testing was undertaken to represent each of the lithological and lateritic units that were identified.

The first phase served as a scoping study in which the overall magnitude of the potential for acid generation was determined based primarily on static test procedures. The programme was designed to identify lithologies that may produce acid and those that may consume acid, and to assess the overall variability of acid generation potential (i.e. sulphide minerals) and acid neutralisation capacity in the lithological units.

Based on the understanding developed in the first phase, additional samples were selected in the second phase for static testing to improve the acid generation potential and acid neutralisation capacity classification of some samples and rock types. In addition, samples were selected and subjected to kinetic testing procedures to establish the potential acid generation and metal leach rates that may occur within the waste material landforms. SRK also assessed the waste rock management and closure strategy proposed by TGP.

2.2 Identification of Lithological Units

The Tropicana gold deposit is hosted in metamorphic rocks that lie in the eastern margin of the Yilgarn Craton. It comprises two mineralised zones; the Tropicana zone to the north and the Havana zone to the south. Table 2.1 presents rock types indentified in the Tropicana geological database developed by AngloGold Ashanti. Samples of each rock type were selected for geochemical characterisation.

Table 2.1 Summary of Rock Types Identified for the Tropicana and Havana Deposits

Rock Type	Description	Comment
AL	Archaean Laterite	
ALCY	Saprolite	
AN?	Archaean Gneiss	
ANA	Archaean amphibolitic gneiss	
ANC_{RT}	Ferruginous Chert	ANC, ANC_{RT} and ANCA can be considered a single unit (not expected to be dissimilar geochemically)
ANCA	Archaean Ferruginous Chert	
ANC	Archaean Chert	
ANF	Feldspathic Gneiss (undifferentiated)	
ANFA	Feldspathic Gneiss (Amphibole rich)	
ANFF	Feldspathic Gneiss (k-fld>>qtz)	
ANFQ	Feldspathic Gneiss (fld+qtz; qtz=7-25%)	Relatively common, subordinate to other garnet gneiss divisions
ANG	Garnet gneiss (undifferentiated)	
ANGA	Garnet Gneiss (amphibole-rich)	
ANGQ	Garnet gneiss (quartz-rich)	
APP	Pegmatites (Metamorphic; All sorts)	
APPQ	Archaean Pegmatite Feldspar quartz	
AX	Sulphide rich rock (feldspar + qtz)	
AZ	Archean schist (undifferentiated)	Subdivisions of AZB, AZC and AZS can be grouped together and be represented by the Archean schist (undifferentiated)
AZB	Schist (biotite)	
AZC	Schists (chlorite)	
AZS	Schist (sericite)	
MS	Permian sediments (undifferentiated)	
PPB	Proterozoic basalt intrusive	
PPD	Proterozoic dolerite intrusive	
QLSD	Quaternary sands	Likely to be non-reactive and behave in a similar way
TL	Tertiary cover	

2.3 Sampling

2.3.1 Sampling Approach

Samples were selected to provide as broad spatial coverage of lithological units as possible whilst still remaining within the anticipated '$1000 pit shell'. The TGP block model was not available to allow sample selection on the basis of waste material abundance. Rather, Initial samples selections were based on a survey of available drill core and estimating, the representation of each lithological unit from the percentage of length of drill core intercept the relative abundance of waste that might be produced. An estimate of the relative sulphide mineral content associated with the rock units was also made based on core logs and core observations to identify those units that may have a potential to generate acid. Sampling frequencies reflected this initial distribution estimate and the relative abundance of sulphide mineralisation.

The samples comprised material from Diamond Drill (DD) cores and Reverse Circulation (RC) chips. Sample recovery from the core shed and preparation was undertaken by AGAA representatives with guidance from SRK.

Samples were selected from core considered to be representative of the waste material that will be generated from the Tropicana and Havana Zones. The locations of drill hole collars are shown in Appendix A and the cross sections showing the drill core intersections with the ore deposit are shown in Appendix B. The sample locations relative to the ore body can be traced by locating the sample interval on the applicable drill hole.

Since the Tropicana Zone was under-represented in the first round of sampling, representative samples of materials from that zone were selected in the second round. There were however some constraints on sample selection within the Tropicana Zone. For example, in the case of ferruginous chert divisions (ANC_{RT}), the intervals included thin intercalations of other rock types which would be impractical to separate out at the scale of a mining operation. Additional samples were also taken from lithological units identified in the first sampling phase that required improved characterization.

The combined sample frequency for the two rounds of sampling is shown in Table 2.2. The table also shows the number of samples that classified as low grade materials. The relative waste material abundance shown in the table reflects an estimate generated by AGAA based on kriging and block modelling of the pit shell subsequent to completion of the testing programme. Furthermore, on the recommendation of AGAA, the ANC, ANC_{RT} and the ANCA units are to be considered a single unit. Even so, the sample frequency for the group is over represented compared to the weighted distribution estimate (1.8%) (Table 2.1), and the ANFF, ANFQ, and ANG may be under represented, depending on their reactivity. This initial sampling bias resulted from the observed abundance of sulphide mineralisation and poorly understood waste materials volumes at the time of sample selection. Future programmes will aim to correct this bias.

Overall, about 97.2 % of the waste material types are represented in the sampling program.

Table 2.2 Summary of First Round Waste Rock Sampling Frequency

Rock Type	Description	Total Samples		Est. Waste Distr. (%)	No. of Total Samples Low Grade Samples
		No.	Distr. (%)		
AL	Archaean Laterite	-	-	1.2	
ALCY	Saprolite	7	4.7	13.8	-
AN?	Archaean Gneiss	4	2.7	1.7	2
ANA	Archaean amphibolitic gneiss	1	0.7	1.2	-
*ANC_{RT}	Ferruginous Chert	15	10.1	-	-
*ANCA	Archaean Ferruginous Chert	1	0.7	-	1
*ANC	Archaean Chert	-	-	1.8	-
ANF	Feldspathic Gneiss (undifferentiated)	12	8.1	7.5	3
ANFA	Feldspathic Gneiss (Amphibole rich)	9	6.1	6.6	-
ANFF	Feldspathic Gneiss (K-fld>>qtz)	25	16.9	6.2	6
ANFQ	Feldspathic Gneiss (fld+qtz; qtz=7-25%)	17	11.5	8.1	2
ANG	Garnet gneiss (undifferentiated)	5	3.4	11.2	-
ANGA	Garnet Gneiss (amphibole-rich)	16	10.8	18.3	-
ANGQ	Garnet gneiss (quartz-rich)	3	2.0	-	-
APP	Pegmatites (Metamorphic; All sorts)	0	0.0	0.2	-
APPQ	Archaean Pegmatite Feldspar quartz	3	2.0	0.8	-
AX	Sulphide rich rock (feldspar + qtz)	2	1.4	0.05	-
AZ	Archean schist (undifferentiated)	5	3.4	2.7	-
AZB	Schists (biotite)	1	0.7	-	-
AZC	Schists (chlorite)	3	2.0	-	1
AZS	Schists (sericite)	1	0.7	-	-
MS	Permian sediments (undifferentiated)	2	1.4	2.5	-
PPB	Proterozoic basalt intrusive	1	0.7	0.8	-
PPD	Proterozoic dolerite intrusive	3	2.0	0.9	-
QLSD	Quaternary Sands	2	1.4	4.8	-
TL	Tertiary cover	10	6.8	8.1	-
-	Other	-	-	1.6	-
	Total	**148**	**100**	**100**	**15**
	Havana	93	62.8	-	8
	Tropicana	55	37.2	-	7

Notes: ANC, ANC_{RT} and ANCA all considered the same unit
Total number of samples includes low grade sample numbers; waste rock sample numbers = total – low grade = 148 – 15 = 133 samples in total.

2.3.2 Sample Preparation

Samples were crushed to less than 2mm for paste pH and EC measurements and pulverised to less than 75μm for elemental analyses.

2.4 Static Testing Methods

The static test parameters and measurement procedures utilised in the testing programme are summarised in Table 2.3. Detailed descriptions together with guidelines for Interpretation can be found in Appendix C. The samples were sent to Genalysis Laboratory Services in Maddington, Western Australia for the static tests shown in the table. All the samples from the first and second sampling program were submitted for static testing procedures

Table 2.3 Static Test Measurements and Analytical Methods

Measurement	Analytical Method
Paste pH and Paste Electrical Conductivity (EC)	1:2 solid:liquid ratio using pH and EC meter
Total sulphur	Leco Analyser
Sulphate sulphur	ICP-OES
Total carbon/total inorganic carbon (TIC)	Leco/IR on hot acid digest
Acid Neutralising Capacity (ANC)	Modified Sobek method
Net acid generation (NAG)	Single stage NAG test
Whole rock chemical assay	ICP-OES/ICP-MS on four acid digest
Acid Buffering Characteristic Curve (ABCC)	Acid titration of solid sample
Kinetic NAG	NAG with temperature and pH time series measurement
Sequential NAG	Multi stage NAG test

Note: See Appendix C for detailed method descriptions

2.5 Kinetic Testing

Modified AMIRA type column tests procedures were followed. The detailed procedure is provided in Appendix C. Eight samples were selected for column leach testing to represent a range of lithological units as shown in Table 2.4. Because the kinetic testing program was accelerated, the sample selection concentrated on to those lithological units that were anticipated to be net acid generating and would require specific handling and disposal criteria. As the understanding of the waste material distribution improved over time, the sample selection proved to be bias toward minor units that, whilst they are net acid generating, volumetrically represent a small proportion of the total waste material to be produced. As noted before future testing programme would correct this bias. The results are discussed in the next chapter.

Table 2.4 Kinetic Testing Sample Summary

Sample ID	Zone	Lithological Unit	
		Code	Description
SRK003	Tropicana	ANC_{RT}	Ferruginous Chert
SRK006	Havana	ANG	Garnet Gneiss (undifferentiated)
SRK033	Havana	ANFF	Feldspathic Gneiss (K-fld>>qtz)
SRK051	Havana	ANFF	Feldspathic Gneiss (K-fld>>qtz)
SRK054	Havana	ANFQ	Feldspathic Gneiss (fld+qtz; qtz=7-25%)
SRK075	Havana	ANC_{RT}	Ferruginous Chert
SRK077	Havana	ANF	Feldspathic Gneiss (undifferentiated)
SRK088	Havana	AX	Sulfide-rich rock (feldspar + qtz)

3 Results and Discussion

3.1 Static Testing Results

The complete static test results, comprising the paste parameters, acid base account and elemental analyses are provided in Appendix D. The results are briefly discussed in the following sections.

3.1.1 Paste pH and Paste EC

The paste pH and paste electrical conductivity (EC) test was designed originally to measure the load of oxidation products associated with waste material that have been weathering for extended periods. The paste pH and conductivity therefore generally provide an indication of the state of the sample at the time of testing. In the case of drill core, test results have to be considered in the light of how the samples were obtained (e.g. wet or dry drilling as the drilling fluids may interact contribute to the test outcome) and the state of weathering (i.e. how long the core had been in storage, how it had been stored and handled etc.).

The samples were obtained from drill core and drill cuttings that have been stored in core trays for up to a year before testing and may have undergone some oxidation. The results may also be confounded by the fact that the core samples may contain salinity from drilling fluids or natural salinity associated with saline groundwater. Groundwater quality monitoring results provided by AGAA indicate that the regional groundwater in the area of the project typically has TDS values ranging from 10,000 to 40,000 mg/L, predominantly as sodium/magnesium chlorides, but elevated concentrations of sulphate (ranging from 600 mg/L to 17,000 mg/L with an average of about 4600 mg/L) are also present. Natural pH values range from about 6.6 to about 8.0 with an average of about 7.3. Therefore, where the pH decreases below this range it may be used to infer reactivity of the sulphide minerals (i.e. acid generation). Interpretation of the EC results however is less well defined. A high electrical conductivity conventionally used to infer soluble salts from oxidation may however in the current samples only indicate salinity already present in the sample (i.e. evaporates or naturally saline porewater) and not necessarily generated from oxidation. While the test may be enhanced by examining the water quality of the leachate that is generated, it would not be possible to distinguish from sulphate present in the sample at the time of drilling and that generated subsequent to placement in storage. (In any event, analysis of the leachate goes beyond the intended purpose of the paste parameter test.)

The results for the waste material samples indicate that the majority of paste pH values were in the neutral to alkaline pH range, as shown in the cumulative distribution plot provided in Figure 3.1. However, about 3 % (4 samples altogether) of the samples had paste pH values below 5. Three of these were ferruginous chert (ANC_{RT}) and one was a saprolite (ALCY). A further 5 % (6 samples) indicated a paste pH of between 5 and 6, comprising three ferruginous chert (ANC_{RT}), one saprolite (ALCY) and one Tertiary cover (TL) sample. These results suggest that the ferruginous chert and possibly a portion of the saprolite could be net acid generating.

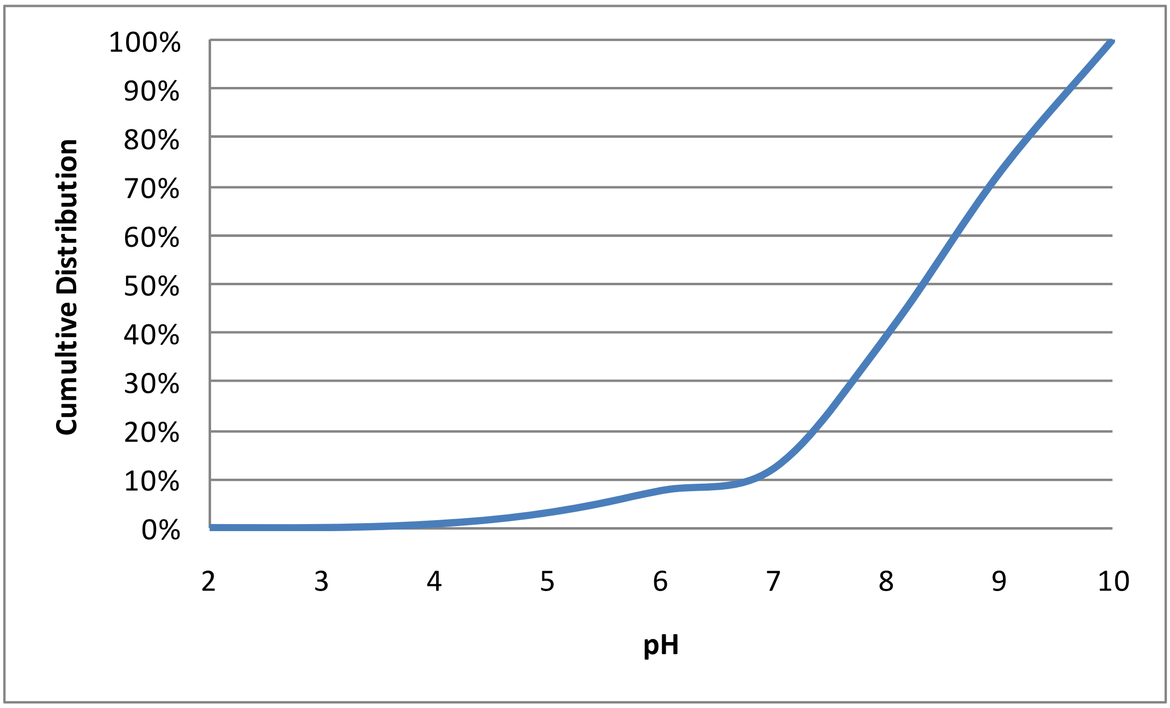

Figure 3.1 Cumulative Distribution of Paste pH Values

A distribution plot of the paste EC results is provided in Figure 3.2. More than 35 % of the samples had an EC value of above 2 mS/cm, generally indicating an elevated soluble salt content. More significantly, about 15 % of the samples indicated a paste EC in excess of 5 mS/cm. These samples originated primarily from the ferruginous chert (ANC $_{RT}$) and the saprolite (ALCY). All samples from the Tertiary cover (TL) generally had high paste EC values which may be due to the accumulation of evaporates within this formation.

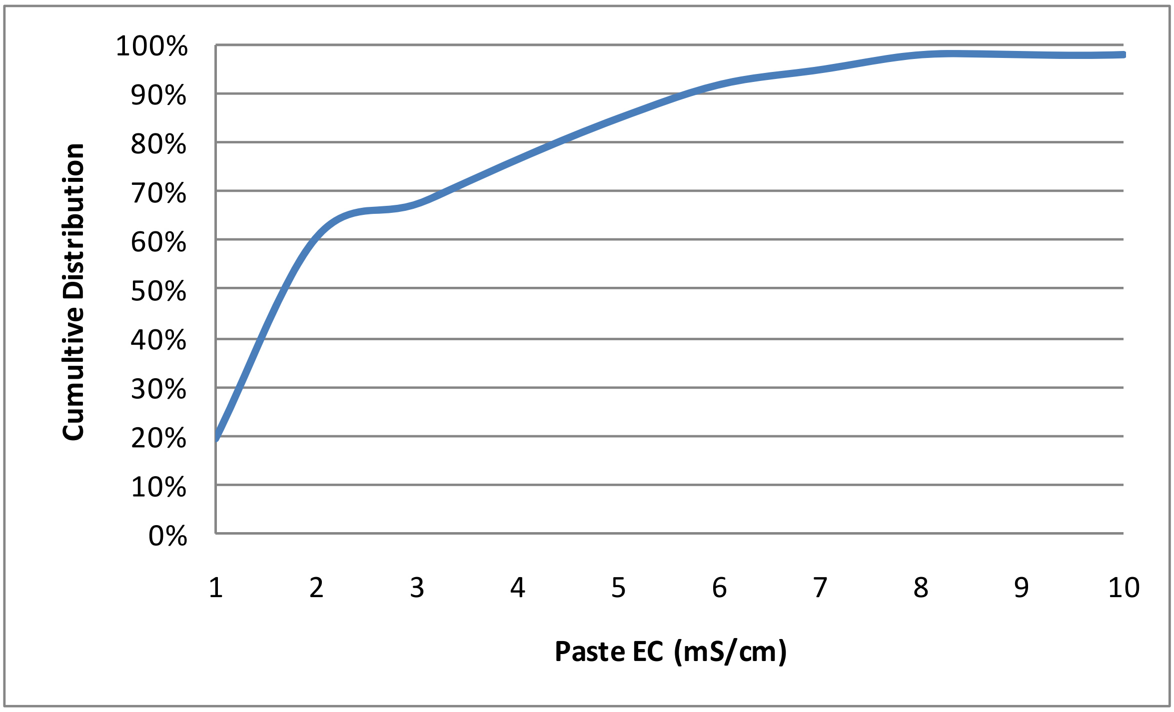

Figure 3.2 Cumulative Distribution of Paste EC Values

The EC results suggest that irrespective of oxidation, it is likely that there will be an initial flush of naturally salinity associated with waste material. The properties of the salinity would be expected to be very similar to that of the natural groundwater within the area.

Similar observations apply to paste pH and EC results obtained for the low grade samples.

3.1.2 Sulphur Speciation and Distribution

Total sulphur ranges up to 14.3 %, with an average of about 0.83 %. The sulphate sulphur ranges up to 0.94 % with an average of about 0.09 % suggesting that up to 10 % of the total sulphur could have been oxidised. The proportion oxidation inferred however is a function of the secondary sulphate mineral phases present before the sample was extracted (by drilling) as well as the length of time that the samples has been in storage (and exposed to atmospheric conditions).

An overall comparison was made for sulphur and sulphate content of samples originating from the Havana and Tropicana deposits respectively, as shown in Table 3.1. While the average sulphur content of samples from the Tropicana deposit (1.4 %) was found to be almost three times that of samples originating from the Havana deposit (0.53 %), the results are biased by the number of samples representing the ANC group of units which has a very sulphur content compared to other units. A better indication of the sulphide mineral content would be the mass weighted average which was calculated assuming that the distribution of the waste material from the various lithologies would be similar for the two zones. (Note that this would need to be verified by block modelling of the waste production from each zone.) As shown, the mass weighted average sulphur content is about 0.44 % for the Tropicana zone waste material compared to 0.32 % for the Havana zone. The difference is considered marginal. Direct comparison of sulphur contents between corresponding lithological units (for which 4 or more samples have been analysed) suggests that the ferruginous chert (ANC_{RT}) from the Tropicana zone has a higher sulphide content than in the Havana zone. The Tropicana felspathic gneiss (K-fld >> qtz) (ANFF) may also have a marginally higher sulphide content, whereas there appears to be no difference in mineralisation between of the felspathic gneiss (fld + qtz 7 – 25 %) (ANFQ) and the Tertiary cover (TL) materials from the respective zones.

While the average sulphate content calculated from all samples of the Tropicana deposit samples was about double that of samples from the Havana deposit (0.13 % compared to 0.06 %), mass weighted average again showed only a marginal difference (0.08 % compared to 0.10 %),

Table 3.1 Comparison of Sulphur Species in Havana and Tropicana Samples

Rock Type	Description	Est. Wt. Distr. (%)	Tropicana			Havana		
			N	S(%)	S-SO_4(%)	N	S(%)	S-SO_4(%)
AL	Archaean Laterite	1.2	-	-	-	-	-	-
ALCY	Saprolite	13.8	6	0.12	0.09	2	0.07	0.09
AN?	Archaean Gneiss	1.7	0	-	-	2	0.05	0.08
ANA	Archaean amphibolitic gneiss	1.2	1	0.25	0.12	0	-	-
*ANC_{RT}	Ferruginous Chert	1.81	8	5.95	0.44	7	1.27	0.08
*ANCA	Archaean Ferruginous Chert							
*ANC	Archaean Chert							
ANF	Feldspathic Gneiss (undifferentiated)	7.5	1	0.76	0.10	8	0.61	0.06
ANFA	Feldspathic Gneiss (Amphibole rich)	6.6	1	0.16	0.06	7	0.20	0.04
ANFF	Feldspathic Gneiss (K-fld>>qtz)	6.2	8	1.29	0.09	12	0.87	0.05
ANFQ	Feldspathic Gneiss (fld+qtz; qtz=7-25%)	8.1	6	0.50	0.05	9	0.55	0.08
ANG	Garnet gneiss (undifferentiated)	11.2	0	-	-	5	0.21	0.04
ANGA	Garnet Gneiss (amphibole-rich)	18.3	3	0.44	0.07	12	0.20	0.04
ANGQ	Garnet gneiss (quartz-rich)	-	6	0.50	0.05	9	0.55	0.08
APP	Pegmatites (Metamorphic; All sorts)	0.2	3	0.45	0.06	0	-	-
APPQ	Archaean Pegmatite Feldspar quartz	0.8	0	1.00	2.00	4	5.00	6.00
AX	Sulphide rich rock (feldspar + qtz)	0.05	0	-	-	2	3.20	0.08
AZ	Archean schist (undifferentiated)	2.7	4	0.74	0.09	1	0.19	0.03
AZB	Schists (biotite)	-	0	-	-	1	0.34	0.10
AZC	Schists (chlorite)	-	2	0.64	0.11	0	-	-
AZS	Schists (sericite)	-	0	-	-	1	0.70	0.11
MS	Permian sediments (undifferentiated)	2.5	0	-	-	2	0.09	0.11
PPB	Proterozoic basalt intrusive	0.8	0	-	-	1	0.28	0.07
PPD	Proterozoic dolerite intrusive	0.9	0	-	-	3	0.32	0.07
QLSD	Quaternary Sands	4.8	0	-	-	2	0.01	< 0.01
TL	Tertiary cover	8.1	4	0.07	0.04	5	0.06	0.07
	TOTAL	98.5	53	-	-	95	-	-
	Average	-	-	1.41	0.13	-	0.53	0.06
	Mass weighted average	-	-	0.44	0.08	-	0.32	0.10

The differences for the ANC_{RT} and felspathic gneiss (K-fld >> qtz) (ANFF) between the two Tropicana and Havana zones, may need to be considered in the waste rock management plan. Notwithstanding these differences, because samples for some lithological units have been obtained only from either the Tropicana zone (e.g. Archaean amphibolitic gneiss, Pegmatites (Metamorphic; All sorts), and the Schists (chlorite)) or the Havana zone (e.g. Archaean Gneiss, Garnet gneiss (undifferentiated), Sulphide rich rock (feldspar + qtz), Schists (biotite), Schists (sericite), Permian sediments (undifferentiated), Proterozoic basalt intrusive, Proterozoic dolerite intrusive, and, Quaternary Sands), and because the waste material distribution is given for the entire project, in the remainder of the evaluation does not distinguish between the two zones but treats the lithological units as single units irrespective of the zone.

A summary of the average sulphur content and speciation, ordered in increasing sulphur content, is provided in Table 3.2. As shown in the table, almost 70 % of the waste material is expected to have a total sulphur content of less than 0.25 % which generally indicates no potential for acid generation, or a very low potential. Only about 8 to 10 % of the waste material, comprising the felspathic gneiss (ANFF), the pyrite rich rock (AX) and the ferruginous chert (ANC_{RT}), is expected to have an average sulphur content of more than 1 %.

Table 3.2 Summary of Sulphur Speciation in Lithologial Units

Lithology	Wt. Distr. (%)	N*	S(T) %			S(SO$_4$) %			S(2-) %		
			Average	Min.	Max.	Average	Min.	Max.	Average	Min.	Max.
ALCY	13.8	8	0.11	0.03	0.38	0.09	0.04	0.25	0.03	0.00	0.13
AN?	1.7	2	0.05	0.05	0.06	0.08	0.06	0.09	0.00	0.00	0.00
ANA	1.2	1	0.25	-	-	0.12	-	-	0.13	-	-
ANC $_{RT}$	1.8	15	3.77	0.14	14.32	0.27	0.01	0.94	3.49	0.01	13.38
ANF	7.5	9	0.62	0.01	1.79	0.06	0.02	0.12	0.57	0.00	1.71
ANFA	6.6	8	0.19	0.02	0.45	0.04	0.01	0.07	0.15	0.01	0.40
ANFF	6.2	20	1.04	0.03	2.39	0.07	0.02	0.16	0.97	0.00	2.30
ANFQ	8.1	15	0.53	0.05	1.32	0.07	0.03	0.28	0.46	0.00	1.21
ANG	11.2	5	0.21	0.11	0.32	0.04	0.01	0.06	0.17	0.10	0.26
ANGA	18.3	16	0.23	0.01	1.08	0.04	0.01	0.18	0.19	0.00	0.90
ANGQ	-	3	0.12	0.02	0.22	0.03	0.01	0.04	0.09	0.01	0.18
APP	0.2	3	0.45	0.17	0.83	0.06	0.03	0.11	0.39	0.14	0.72
AX	0.05	2	3.20	1.41	4.98	0.08	0.06	0.10	3.12	1.35	4.88
AZ	2.7	5	0.63	0.19	1.58	0.08	0.03	0.15	0.56	0.16	1.43
AZB	-	1	0.34	-	-	0.10	-	-	0.24	-	-
AZC	-	2	0.64	0.60	0.68	0.11	0.05	0.16	0.54	0.44	0.63
AZS	-	1	0.70	-	-	0.11	-	-	0.59	-	-
MS	2.5	2	0.09	0.04	0.14	0.11	0.05	0.17	0.00	0.00	0.00
PPB	0.8	1	0.28	-	-	0.07	-	-	0.21	-	-
PPD	0.9	3	0.32	0.31	0.33	0.07	0.07	0.08	0.24	0.24	0.25
QLSD	4.8	2	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00
TL	8.1	9	0.06	0.01	0.17	0.06	0.02	0.18	0.01	0.00	0.06

Note: *Low Grade ore samples are not included

The average sulphur content of the low grade ore samples (not shown in the table above) was found to be 2.0 %, with a sulphate content of about 0.13 %. The results suggest that waste material close to the ore zone may be more mineralised than waste material more distant (e.g. pit walls) from the ore zone.

3.1.3 Acid Neutralization Capacity

The acid neutralization capacity or potential (NP) is determined by reacting the sample with excess acid (generally to a pH of less than 2) and then determining the acid consumed by the sample. This results in both carbonate and silicate minerals reacting. However, during high rates of acid generation only the carbonate minerals (predominantly calcium and magnesium carbonates) react sufficiently rapidly to neutralise the acidity and maintain neutral pH conditions. Therefore, the carbonate NP equivalent (CarbNP) was calculated from the inorganic carbon content of each samples to provide an indication of the carbonate mineral content. While recognising that not all carbonate minerals react to neutralise acidity (e.g. siderite), using inorganic carbon content to infer carbonate NP is a reasonable first step to assess the readily available neutralization capacity.

The average NP results for each lithological unit are summarised in Table 3.3. The table also provides the corresponding average carbonate NP and the ratio of average CarbNP to average NP for each unit (expressed as a percentage). The last column provides an estimate of the percentage of the total CarbNP associated with each lithological unit.

Table 3.3 Summary of NP and Carbonate NP Results

Lithology	Wt. Dist. (%)	CarbNP (kgH2SO4)				NP (kgH2SO4)				CarbNP / NP Ratio (%)	Cont. CarbNP (%)
		N*	Average	Min.	Max.	N	Average	Min.	Max.		
ALCY	13.8	3	5	1	13	8	15	0	69	32%	4%
AN?	1.7	2	1	1	1	2	5	2	7	18%	0%
ANA	1.2	1	62	-	-	2	143	-	-	44%	4%
ANC RT	1.8	15	10	1	71	14	35	0	104	29%	1%
ANF	7.5	9	22	1	38	9	62	29	99	36%	9%
ANFA	6.6	8	21	1	42	8	62	27	87	34%	7%
ANFF	6.2	18	16	1	33	20	52	8	89	32%	5%
ANFQ	8.1	15	21	1	74	15	52	10	115	40%	9%
ANG	11.2	5	41	22	90	5	83	41	171	49%	24%
ANGA	18.3	16	19	1	44	16	57	25	86	33%	18%
ANGQ	-	2	26	24	29	3	47	16	69	57%	0%
APP	0.2	2	5	1	9	3	36	13	50	13%	0%
AX	0.05	2	21	20	22	2	60	55	65	35%	0%
AZ	2.7	5	31	1	98	5	98	51	176	31%	4%
AZB	-	1	41	-	-	1	97	-	-	42%	0%
AZC	-	1	28	28	28	2	67	47	87	42%	0%
AZS	-	1	39	-	-	1	109	-	-	36%	0%
MS	2.5	1	2	2	2	2	6	2	10	27%	0%
PPB	0.8	1	25	-	-	1	79	-	-	31%	1%
PPD	0.9	3	46	45	46	3	114	96	123	40%	2%
QLSD	4.8	2	3	1	6	2	9	4	14	36%	1%
TL	8.1	7	23	1	106	9	28	0	126	83%	10%
									Average	**37%**	**-**

Note: *Not all of the samples were analysed for inorganic carbon content.

The results indicate that some units have little or no neutralization potential and therefore would not be expected to provide any buffering capacity. The units include the saprolite (ALCY), Archaean gneiss (AN?), Permian sediments (MS) and the Quaternary sediments (QLSD) and represent about 23 % (wt) of the waste material. In comparison about 52 % of the total mass of CarbNP is contained about 37 % of the waste material comprising the Garnet gneiss (undifferentiated) (ANG) (containing about 24%), Garnet Gneiss (amphibole-rich) (ANGA) (containing about 18 %) and the Tertiary cover (TL) (containing about 10 %). These units typically have sulphide sulphur concentrations of less than 0.2 % (see Table 3.2) and therefore could be considered key sources of neutralization capacity.

The CarbNP to NP ratio ranges from about 13 % (pegmatites, APP) to 83% (Tertiary cover, TL). Overall the average is about 37%. This suggests that on average only about 37 % of the NP may be available as carbonate minerals, and therefore readily available to buffer pH within a neutral pH range. As noted before, for the NP determination the sample is reacted with excess acid and the pH decreases to less than 2. The acid neutralization reactions that occur at this low pH (i.e. outside the normal range that carbonate minerals would react) would account of the difference between the CarbNP and the NP values. This is discussed further in the next section.

3.1.4 Acid Buffering Characteristics

Ten samples representing a range of NP and CarbNP values were selected for acid buffering characteristic curve testing. The complete results are provided in Appendix D, illustrated in Figure 3.3 and are summarised in Table 3.4.

As shown in the figure, the pH of two of the samples (SRK074; SRK037) commenced at a pH of less than 6. This is consistent with an inorganic carbon content below detection (i.e. no carbonate minerals) and therefore no pH buffering capacity. The remainder of the samples all commenced at a pH above 6, were buffered for different periods in the neutral pH range and then decreased to acidic values. This is typical of carbonate mineral buffering. The variation amongst the different samples reflects differences in initial carbonate mineral content and possibly mineral composition (e.g. calcite, dolomite etc.).

The curves were used to estimate the NP equivalency (i.e. NP equivalent acid that had been consumed) to a pH endpoint of 6 (for carbonate phases) and 4.5 to infer the availability of the NP and the CarbNP. These results are show in Table 3.4 and indicate that on average about 21 % (maximum 37 %) of the measured NP is actually available to buffer the pH to above 6; the availability increases on average to about 40 % at a pH of 4.5.

The results also indicate that most of the CarbNP (~ 65 % on average, ranging up to 84 %) is available to buffer the pH to above 6. In general, all of the CarbNP had been consumed at pH 4.5.

In summary, the acid buffering characteristics curves indicate that the CarbNP is a better indicator than NP of the neutralisation potential available to buffer the pH to above 6 (i.e. to prevent the onset of acid generating conditions.)

Table 3.4 Summary of Acid Buffering Characteristic Curves Test Results

					ABCC	Availability		ABCC	Availability
		TIC	CarbNP	NP	pH 6	NP	CarbNP	pH 4.5	NP
Sample	Unit	%	kgH_2SO_4	kgH_2SO_4	kgH_2SO_4	%	%	kgH_2SO_4	%
SRK029	ANC_{RT}	0.17	13.6	47	10	22.1	76.4	14	28.7
SRK074	ANC_{RT}	< 0.01	< 0.8	24	0	0.0	0.0	2	8.7
SRK075	ANC_{RT}	0.89	71.2	104	23	22.5	32.8	52	49.9
SRK045	ANFA	0.41	32.8	77	26	33.7	79.2	30	38.8
SRK077	ANF	0.31	24.8	56	18	32.5	73.3	22	39.4
SRK078	ANF	0.19	15.2	52	9	17.5	59.8	12	22.5
SRK079	ANF	0.27	21.6	49	18	37.1	84.2	21	42.4
SRK033	ANFF	0.34	27.2	62	9	14.7	33.4	19	31.4
SRK037	AN	< 0.01	< 0.8	2	0	0.0	0.0	2	77.9
SRK088	AX	0.27	21.6	55	16	28.3	72.1	25	44.9

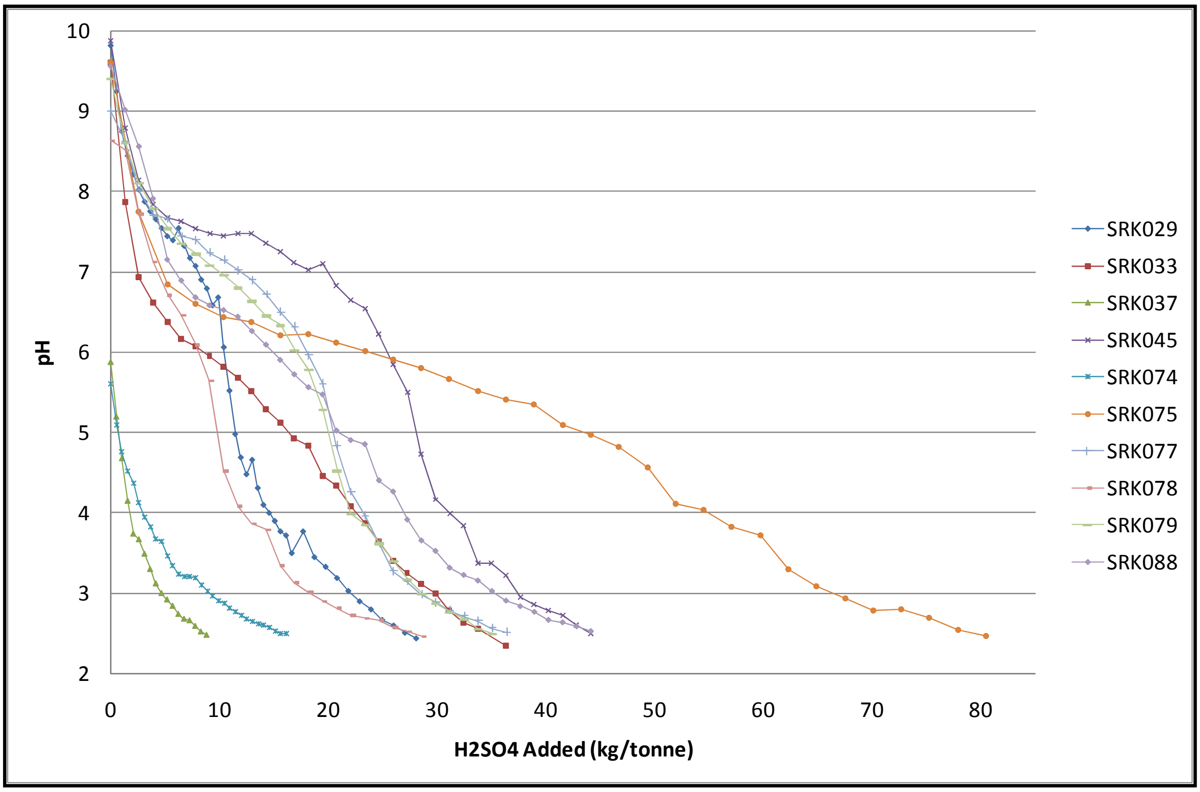

Figure 3.3 Acid Buffering Characteristic Curves for Selected Samples

3.1.5 Net Acid Generation

The net acid generation test provides a direct measure of the potential acid that may be generated by a sample by oxidizing the sulphide minerals with a strong oxidant. The acidity generated is then neutralised directly by the sample and the net acid generated is measured by titration with a strong alkali.

Overall, 20 % of the samples had a NAG pH of less than 4.5 and would be considered net acid generating. The NAG pH of 72 % of the samples was above pH 6.0 and would be considered non-acid forming (NAF). The NAG pH of the balance of the samples fell between 4.5 and 6.

The NAG test results have also been assessed based on the lithological grouping of the samples. The results are summarised in Table 3.5. The table shows for each lithological unit the number of samples tested, the number of samples that returned a NAG pH below 4.5, the number of samples that returned a NAG pH between 4.5 and 6, and the average NAG at pH values of 4.5 and 7. The last column shows the ration of the NAG at pH 7 to that at pH 4.5.

The results indicate that the NAG pH for samples from 9 units (ANA, ANFA, ANFA-ANGA, ANG, ANGQ, AZB, AZS, PPB, and PPD) did not decrease below six. These units would be considered non acid forming (NAF), with reactive neutralising minerals, and represent about 20.7 % (by wt) of the waste material. Units that had no NAG pH values below 4.5 would also be considered non acid forming and include the feldspathic gneiss (undifferentiated) (ANF), schists and quaternary (QLSD). These units represent a further 30.1 % of the waste material, and together represent 50.8 % of the waste material.

Only three units, Feldspathic gneiss (ANFF), sulphide rich rock (AX), and ferruginous chert (ANC_{RT}), returned a significant proportion of samples with NAG pH values below 4.5. (Note that all the ANFF samples that returned a NAG pH of less than 4.5 originated from the Tropicana ore zone supporting the previous observation that this ore zone is likely more mineralised than the

Havana ore zone, see Table 3.1.) The average measured NAG values at pH 7 were 8.4, 47.5 and 74.4 kg H_2SO_4 per tonne respectively for each unit. Combined, these units represent only about 8 % (by wt) of the waste material.

While the overall results for the balance of the waste material units indicated a very low potential for acid generation, the number of samples that returned NAG pH values below 4.5 (28 out of 133 or 21%) suggest that some portion of the waste material units (e.g. mineralised zones only) may be net acid generating and further analysis is required to evaluate the overall potential for acid generation. Corrected for the weight distribution for the waste material by lithology, the proportion by weight would be about 9 % of the total mass.

Table 3.5 Summary of NAG Test Results

Unit	N	Number NAG pH		Avg. NAG (kgH_2SO_4/t)		NAG Ratio (pH7 / pH4.5)
		< 4.5	4.5 to 6	pH 4.5	pH 7	
ALCY	8	1	2	0.0	0.8	-
AN?	2	0	1	0.0	1.0	-
ANA	1	0	0	0.0	0.0	-
ANC_{RT}	15	13	0	58.5	74.4	1.27
ANF	9	0	1	0.0	0.1	-
ANFA	8	0	0	0.0	0.0	-
ANFF	20	6	0	6.0	8.4	1.40
ANFQ	15	2	0	1.6	2.5	1.54
ANG	5	0	0	0.0	0.0	-
ANGA	16	1	0	0.3	0.6	2.00
ANGQ	3	0	0	0.0	0.0	-
APP	3	1	0	0.7	1.3	2.00
AX	2	2	0	38.0	47.5	1.25
AZ	5	2	0	2.4	4.2	1.75
AZB	1	0	0	0.0	0.0	-
AZC	2	0	1	0.0	0.5	-
AZS	1	0	0	0.0	0.0	-
MS	2	0	2	0.0	2.5	-
PPB	1	0	0	0.0	0.0	-
PPD	3	0	0	0.0	0.0	-
QLSD	2	0	0	0.0	0.5	-
TL	9	0	3	0.0	1.3	-
TOTAL	**133**	**28**	**10**	-	-	-

In the NAG measurement, titration to pH 4.5 generally accounts for free acid (H_2SO_4) and ferric iron generated during the oxidation of sulphide minerals (that has not been neutralized by the contained NP). Titration from pH 4.5 to pH 7 generally accounts for acidity associated with some metals, such as copper, that are soluble at pH 4.5 but practically insoluble at pH 7. Acidity attributed to un-oxidised ferrous iron will also be accounted for in the titration up to pH 7 (ferrous iron remains soluble at pH 4.5; however oxidation to ferric by atmospheric oxygen accelerates as the pH increases).

The ratio of acidity for the two titrations (i.e. pH4.5:pH7) may be used to infer whether or not the acidity due to metal ions (other than ferric iron) is significant. Where the ratio is about one, there is no additional acidity, but the greater the ratio the higher the contribution from metals other than ferric iron. Where available, the ratio ranged from 1.27 to 2, suggesting that other dissolved metals are being release when acidic conditions develop. These metals will be identified as part of the kinetic testing programme as described in a later section.

3.1.6 Sequential NAG Testing

The purpose of the Sequential NAG test is to verify that the single step NAG test is capable of completely oxidizing the available sulphide minerals and therefore would accurately identify potentially acid generating samples. The results are provided in Appendix D and are summarised in Table 3.6. The following conclusions can be drawn from these results:

- Not all of the sulphide sulphur is oxidised in the first stage of the test (e.g. SRK025, SRK054, SRK074, SRK077, SRK078), and not all the sulphide is oxidised even if the sulphide content is relatively low (e.g. SRK025 and SRK078 – S(S2-) < 1 %).

- Not all of the samples that generated acidity were identified in the first stage (e.g. SRK054; SRK077) of the test. (Note that the single stage NAG test results for samples SRK033, -077, -078 and -096 failed to identify these as net acid generating contrary to the sequential test outcome.) This means that the NAG test results may not have identified all the samples that may be net acid generating (i.e. the test is susceptible to false negatives).

- The net acid generation potential calculated based on the NP measurement underestimates the overall potential for acid generation because not all of the NP is available for acid neutralization whereas the CarbNAPP indicated a potential for net acid generation in each event that NAG test resulted in net acid generation.

Table 3.6 Summary of Sequential NAG Test Results

Sample	Unit	NAPP kgH_2SO_4/t	CarbNAPP kgH_2SO_4/t	NAG pH	NAG kgH_2SO_4/t	Cum. NAG kgH_2SO_4/t	NAPP Consumed (%)	CarbNAPP Consumed (%)
SRK025-1	ANC_{RT}	9	7	3.3	2.4	2.4	27.5	32.7
-2				4.6	1.0	3.4	38.9	46.4
-3				5.9	0.3	3.7	42.4	50.4
SRK033-1	ANFF	-28	7	3.5	2.6	2.6	n/a	36.1
-2				5.6	0.3	2.9	n/a	40.3
-3				6.2	0.1	3.0	n/a	41.7
SRK041-1	ANFQ	-3	22	2.7	13.6	13.6	n/a	62.2
-2				4.2	0.7	14.3	n/a	65.4
-3				5.7	0.3	14.6	n/a	66.8
SRK054-1	ANFQ	-13	19	9.7	0	0.0	n/a	0.0
-2				3.1	2.6	2.6	n/a	13.4
-3				6.3	0.3	2.9	n/a	14.9
SRK074-1	ANC_{RT}	83	107	2.3	51	51.0	61.1	47.8
-2				2.8	11.8	62.8	75.3	58.9
-3				2.5	14.9	77.7	93.1	72.9
-4				3.8	0.7	78.4	94.0	73.5
-5				4.8	0.5	78.9	94.6	74.0
SRK075-1	ANC_{RT}	-48	-15	7.2	0	0.0	0.0	0.0
-2				8.1	0	0.0	0.0	0.0
SRK077-1	ANF	-4	28	10	0	0.0	0.0	0.0
-2				2.6	16.7	16.7	n/a	60.4
-3				4.1	1	17.7	n/a	64.0
-4				5.4	0.3	18.0	n/a	65.1
SRK078-1	ANF	-32	5	3.3	2.6	2.6	n/a	52.7
-2				5.8	0.5	3.1	n/a	62.8
-3				5.8	0.5	3.6	n/a	73.0
SRK088-1	AX	-14	20	3.3	11	11.0	n/a	55.5
-2				4.0	0.8	11.8	n/a	59.5
-3				4.8	0.5	12.3	n/a	62.0
SRK096-1	ANFF	-29	11	9.8	0	0.0	n/a	0.0
-2				6.8	0.3	0.3	n/a	2.7
-3				7.4	0	0.3	n/a	2.7

3.1.7 Kinetic Nag Testing

The purpose of the kinetic NAG test is to determine the reactivity of the sulphide minerals present and infer the potential lag time that may occur before the onset of acid generation. Nine samples were selected for kinetic NAG testing and complete results are provided in Appendix D. The results are summarised in Table 3.7, which shows the final pH and the maximum temperature recorded during the test. Plots of the progress of each test are included in the appendix.

The results indicate that the high sulphide sulphur sample (SRK074) rapidly oxidized and reached the highest temperature. This material, characterized by a low CarbNP, would be expected to have a short lag time to becoming net acid generating. The temperature increases in the remainder of the samples that are net acid forming were small and, although the sulphide minerals are reactive, the lag time would be considered to increase with decreasing sulphide sulphur content. For comparison the net acid generation production potential (NAPP) were calculated for the NP and the CarbNP. A positive NAPP indicates a sample has the potential to generate acid whereas for a negative NAPP the sample has an excess neutralization capacity. Significantly, the NAPP calculated from the CarbNP in all instances correctly indicated a potential for net acid generation for samples where the final pH had decreased below the neutral range, confirming the findings of the ABCC test results that suggest the CarbNP is a more accurate measure of the available neutralization capacity.

Table 3.7 Summary of Kinetic Testing Results

Sample	Major Unit	Paste	S(S2-)	CarbNP	NP	MPA	CarbNAPP	NAPP	Kinetic NAG	
		pH	%	kgH_2SO_4/t	kgH_2SO_4/t	kgH_2SO_4/t	kgH_2SO_4/t	kgH_2SO_4/t	Final pH	T (oC)
SRK006	ANG	8.9	0.1	90.4	171	4.5	-86	-166	7.1	23
SRK025	ANC_{RT}	7.5	0.8	18.4	17	26	7	9	3.6	25
SRK042	ALCY	4.5	< 0.01	< 0.8	0	0.3	< 0.5	0.3	4.2	21
SRK074	ANC_{RT}	5.5	3.5	0.8	24	107	107	83	1.9	74
SRK075	ANC_{RT}	8.0	1.8	71.2	104	57	-15	-48	6.8	25
SRK077	ANF	8.2	1.7	24.8	56	52	-28	-4	7.4	23
SRK078	ANF	7.9	0.7	15.2	52	20	5	-32	4.6	24
SRK088	AX	8.1	1.4	21.6	55	41	20	-14	3.3	26
SRK096	ANFF	8.2	1.1	22.4	62	33	11	-29	7.1	23

3.1.8 Elemental Analysis

Geochemical Abundance Indices (GAI) values were used to identify elements that exceed normal crustal abundances and may potentially be leached from the waste material. A summary of the calculated GAI values for the lithological units (based on average elemental contents) is provided in Table 3.8. Note that for convenience zeros have been eliminated from the table.

None of the major elements were found to differ significantly from their mean crustal abundances. The results indicate that the ferruginous chert (ANC_{RT}) and the sulphide rich material (AX) are most mineralised and contain the highest levels of arsenic, cadmium, lead, sulphur, selenium and zinc. Of these, arsenic, cadmium and zinc would be expected to be leached more readily under oxidizing conditions. Although low in sulphur, the Archean gneiss (AN) appears to be slightly elevated in arsenic as well.

While boron is elevated in most of the lithological units, generally it is not expected to leach readily from the waste material. Selenium similarly is relatively elevated in most units, however although selenium chemistry is similar to that of sulphur in many ways, it is readily adsorbed and may not be mobile within the waste material.

Table 3.8: Summary of Significant Geochemical Abundance Indices

Description	As	B	Cd	Co	Cu	Mo	Pb	S	Se	Zn
MCA (ppm)	1.5	10	0.11	20	50	1.5	14	260	0.05	75
ALCY	1	2						1	2	
AN?	2	3						0		
ANA		2						2	1	
ANC $_{RT}$	4	2	3		1	1	2	6	4	1
ANF		2	2			1	1	4	1	
ANFA		1						2		
ANFF		2	1			1	2	4	2	
ANFQ	1	2						3		
ANG	1	2						2	1	
ANGA		3						2	1	
ANGQ		1						1	1	
APP		2						3		
AX	5	2	2	1	2	1		6	5	1
AZ	1	3	1					4	2	
AZB							1	3	1	
AZC		2						4	1	
AZS	1	2				1		4	2	
MS	1	2						1	3	
PPD		2						2		
QLSD								0	1	
TL	1	2						0	3	

Note: MCA – mean crustal abundance; blank cells equate to zero GAI values

3.1.9 Mineralogical Assessment

Mineralogical examinations of eight samples were submitted to Roger Townend and Associates, Consulting Mineralogists, for mineral analysis with particular reference to their acid generating and acid consuming mineral phases. Chemical analyses of the material samples were supplied together with the samples. The samples were analysed by x-ray diffraction (XRD), optical microscopy (PLM) and by scanning electron microscopy (SEM) of polished sections.

The results indicate:

- Sulphide mineralisation includes, pyrite (FeS_2), marcasite (FeS_2), pyrrhotite [$Fe_{(1-x)}S$ (x = 0 to 0.2)] and trace quantities of chalcopyrite ($CuFeS_2$). The general accepted order of reactivity is that pyrrhotite is more reactive than marcasite which is more reactive than pyrite.
- Carbonate minerals that were identified included calcite ($CaCO_3$) and trace amounts of siderite. Whilst the calcite would be expected to react to neutralise acidity, the siderite ($FeCO_3$) will neither consume nor generate acidity.

Significantly, the ABCC results indicated that not all of the carbonate is available for acid neutralization at a pH 6 endpoint. Since only calcite and dolomite will react to buffer the pH to above a value of 6, the carbonates that have reacted to that point are indicative of the available CarbNP that would neutralise acidity. The difference between the pH endpoint acid consumption and the inferred CarbNP represents carbonate minerals that would not react to buffer the pH to circum neutral conditions. This is consistent with the presence of siderite.

Table 3.9 Summary of Mineralogical Compositions for Selected Samples

Mineral	SRK003	SRK026	SRK075	SRK077	SRK084	SRK090	SRK092	SRK095
	ANC $_{RT}$	ANC $_{RT}$	ANC $_{RT}$	ANF	ANFQ	ANFF	ANFA	ANF
Quartz	Dominant	Dominant	Major	Major	Major	Major	Dominant	Dominant
Plagioclase	Accessory	Accessory	Minor	Major	Major	Major	Major	Minor
K Feldspar				Major	Major	Minor	Minor	
Chlorite	Accessory		Accessory					
Garnet	Accessory	Accessory	Accessory					Accessory
Amphibole	Accessory	Accessory				Accessory		
Pyroxenes		Accessory						
Epidote		Accessory		Accessory		Accessory		
Muscovite	Accessory		Accessory					Accessory
Biotite			Accessory	Minor	Accessory	Minor	Minor	Minor
Magnetite	<1%	5%						
Goethite					2-3%	<1%	<1%	1%
Hematite						<1%		
Jarosite					2%			
Mn Oxides							<1%	
Ilmenite	<1%			<1%	<1%	<1%		<1%
Titanite			<1%		<1%			
Graphite	<1%		<1%					
Apatite			<1%	<1%		Accessory	<1%	
Siderite	<1%		<1%					
Calcite			1%					
Pyrite	3%		1.50%	3.50%		<<1%		
Marcasite	3%	<1%	<1%					
Pyrrhotite	<1%	2%	2%					
Chalcopyrite				<<1%				

KEY: dominant > 50%, major 20-50%, minor 10-20% , accessory 1-10%

3.1.10 Acid Generation Classification

3.1.10.1 Classification Criteria

The samples were categorised generally in three classes depending on their potential to generate acid as follows:

- Potentially acid generating (PAF) for the static testing provide clear evidence of net acid generation;
- Non acid forming (NAF) for which the static testing provide clear evidence that the samples are net acid consuming; and,
- Uncertain (UC) for samples that the evidence is less definitive with respect to net acid generation.

While in many cases the criteria for classification are site specific, generally accepted criteria have been developed that usually provide reasonable accuracy with respect to net acid generation. The criteria that have been adopted herein are based on methods described in the ARD Test Handbook (AMIRA, 2002) and the net potential ratio (NPR) method described by Price (1997).

The NPR provides a measure of the proportions of acid neutralising capacity to acid potential:

$$NPR = NP/AP$$

Where AP is the acid generation potential expressed in kg H_2SO_4 /tonne calculated as follows:

$$AP = S(S^{2-}) * 30.6$$

The NPR classifications and the criteria defining the classifications are shown in Table 3.10.

Table 3.10: NPR Classification Scheme

Classification	NPR range
NAF	NPR > 3
UC	1 < NPR < 3
PAF	NPR < 1

The AMIRA classification system relies on the NAG-pH, the net acid production potential (NAPP expressed as kg H_2SO_4 /tonne), the NAG (pH 4.5), as well as the total organic carbon (TOC) as organic carbon interferes with the sulphide oxidation process. The NNAP is determined as follows:

$$NAPP = AP - NP$$

Table 3.11 lists the AMIRA (2002) classifications and the criteria defining the classification.

Table 3.11: Acid-Base Accounting Classification Scheme

Class	Sub-class	Description
NAF	-	Samples with a negative NAPP value and a NAG pH of ≥4.5.
PAF	PAF	Samples with a positive NAPP value and a NAG pH of <4.5.
	PAF-LC	PAF materials associated with low NAG acidities ($NAG_{pH4.5}$ <5kgH_2SO_4/t).
Uncertain	UC(PAF)	Samples with negative NAPP but giving NAG pH values <4.5.
	UC(PAF, high TOC)	PAF samples that are associated with high TOC content (>5 wt%). The high TOC content may have interfered with the NAG test results.
	UC(NAF)	Samples with positive NAPP value but NAG pH values ≥4.5. Some of the sulphur is possibly present in these samples in non-pyritic forms.

LC=low capacity; UC=uncertain; TOC=total organic carbon; NAG pH=pH measured during net acid generation test; TOC=total organic carbon.

The AP, NAPP, NPR values and sample classifications according to both systems are provided in Appendix D. The results are discussed below.

3.1.10.2 Net Potential Ratio

A summary of the number of samples in each class is provided in Table 3.12. The results indicate that about 62 % of the samples are non acid forming (NAF) and about 16 % of the samples may be potentially acid generating. The distribution of the NAF / PAF samples is not dissimilar to that obtained for the NAG test results.

As discussed before, a number of the samples contain a very low sulphide sulphur content, and together with a low NP value could result in an NPR of less than three even though the overall potential for acid generation is negligible. Therefore, the sample distribution was reassessed by reclassifying samples that have a sulphide sulphur content of less than 0.2 % that previously classified as potentially acid generating. The results are included in Table 3.12 and suggest that the fraction of samples that may be potentially acid generating could be as low as 10 %.

The following general observations can also be made:

- Potentially acid generating samples originate predominantly from ferruginous chert (ANC_{RT}), the feldspathic gneiss (K-fld >>qtz) (ANFF), the saprolite (ALCY) and the sulphide rich rock (AX).
- Samples from a number of units classified as uncertain (including ANC, ANF, ANFF, ANFQ, ANGA, APP, AX, and AZ)
- All samples from the rock types ANFA, ANGQ, and TL classified non acid forming.

Table 3.12: Classification of Samples According to the NPR Using NP

Class	Conventional		Adjusted for Sulphide Content	
	N	Distribution	N	Distribution
NAF	83	62%	90	67%
UC	30	22%	30	22%
PAF	21	16%	14	10%

The classification was also used to assess the acid generation potential of the individual lithological units. The results are summarised in Table 3.13. The results indicate that only two units would classify potentially acid forming, namely the ferruginous chert (ANC_{RT}) and the sulphide rich rock (AX) representing about 2 % of the waste material by weight. Two other units classify as uncertain and represent an additional 6 to 7 % by wt of the waste material.

Table 3.13: Classification of Lithologies According to the NPR

Major Unit	N	S(2-) (%)	NP	MPA	NAPP	NPR	Class	Wt Distrib.
ALCY	8	0.04	15	1	-14	12.5	NAF	13.8
AN?	2	0.02	5	1	-4	6.5	NAF	1.7
ANA	1	0.13	143	4	-139	36.8	NAF	1.2
ANC_{RT}	15	3.49	33	107	74	0.3	PAF	1.8
ANF	9	0.57	62	17	-45	3.6	NAF	7.5
ANFA	8	0.15	62	5	-57	13.5	NAF	6.6
ANFF	20	0.97	52	30	-22	1.7	UC	6.2
ANFQ	15	0.46	52	14	-37	3.6	NAF	8.1
ANG	5	0.17	83	5	-78	15.7	NAF	11.2
ANGA	16	0.19	57	6	-51	9.5	NAF	18.3
ANGQ	3	0.09	47	3	-44	16.9	NAF	-
APP	3	0.39	36	12	-24	3.0	UC	0.2
AX	2	3.12	60	95	35	0.6	PAF	0.05
AZ	5	0.56	98	17	-81	5.7	NAF	2.7
AZB	1	0.24	97	7	-90	13.2	NAF	-
AZC	2	0.54	67	16	-51	4.1	NAF	-
AZS	1	0.59	109	18	-91	6.1	NAF	-
MS	2	0.02	6	1	-5	8.2	NAF	2.5
PPB	1	0.21	79	6	-73	12.4	NAF	0.8
PPD	3	0.24	114	7	-106	15.3	NAF	0.9
QLSD	2	0.01	9	0	-9	31.0	NAF	4.8
TL	9	0.02	28	0	-27	59.6	NAF	8.1

However, as discussed previously, not all of the neutralization potential may be available to buffer the pH within the near neutral pH range. The neutralization potential estimated based on the carbon mineral content may be about one third of the measured NP and could significantly affect the acid generation classification.

Using the estimated carbonate mineral NP content, the classification was repeated. The results are shown in Table 3.14 and indicate that by conventional interpretation a much larger proportion of the samples would classify as potentially acid generating. However, when the low sulphide sulphur content is considered, about 67% of the samples classify non acid forming, 11 % of the samples classify as potentially acid degenerating and 22 % of the samples classify as uncertain.

Table 3.14: Classification of Samples According to the NPR Using CarbNP

Class	Conventional		Low Sulphide Content	
	N	Distribution	N	Distribution
NAF	55	41%	90	67%
UC	30	22%	29	22%
PAF	49	37%	15	11%

As before, the classification was also used to assess the acid generation potential of the individual lithological units. The results are summarised in Table 3.15. The results indicate that units that would be considered potentially acid generating increases to include the ferruginous chert (ANC_{RT}), feldspathic gneiss (undifferentiated) (ANFF), the pegmatites (APP), the sulphide rich rock (AX), and the schists, together representing about 8 % of the waste material by weight. Altogether seven units classify as uncertain and represent about 36 % by wt of the waste rock. However, if the low sulphide sulphur content is considered, the saprolite (ALCY), the Archaean gneiss (AN?), the Permian sediments (MS) and the single feldspathic/garnet gneiss (ANFA-ANGA) sample re-classify as non-acid forming, so that the proportion of non acid forming waste increases to 70 % of the material.

Table 3.15: Classification of Lithologies According to the NPR Using CarbNP

Major Unit	N	Avg. CarbNP	Avg. MPA	Avg. NAPP(Carb)	NP(Carb)/AP Ratio	Class	Wt Distrib.
ALCY	8	2	1	-1	1.9	UC	13.8
AN?	2	1	1	0	1.2	UC	1.7
ANA	1	62	4	-59	16.1	NAF	1.2
ANC RT	15	10	107	97	0.1	PAF	1.8
ANF	9	22	17	-5	1.3	UC	7.5
ANFA	8	21	5	-17	4.6	NAF	6.6
ANFF	20	15	30	15	0.5	PAF	6.2
ANFQ	15	21	14	-7	1.5	UC	8.1
ANG	5	41	5	-36	7.7	NAF	11.2
ANGA	16	19	6	-13	3.2	NAF	18.3
ANGQ	3	18	3	-15	6.5	NAF	-
APP	3	3	12	9	0.3	PAF	0.2
AX	2	21	95	75	0.2	PAF	0.05
AZ	5	31	17	-14	1.8	UC	2.7
AZB	1	41	7	-33	5.6	NAF	-
AZC	2	14	16	2	0.9	PAF	-
AZS	1	39	18	-21	2.2	UC	-
MS	2	1	1	0	1.6	UC	2.5
PPB	1	25	6	-18	3.9	NAF	0.8
PPD	3	46	7	-38	6.1	NAF	0.9
QLSD	2	3	0	-3	11.0	NAF	4.8
TL	9	18	0	-18	38.9	NAF	8.1

3.1.10.3 AMIRA

The majority of samples are classified as non acid forming (76 %). The remaining samples classify almost equally into the potentially acid forming (13 %) and uncertain (11 %) classification. Samples that classified potentially acid forming included ferruginous chert (ANC_{RT}), feldspathic gneiss (undifferentiated) (ANFF), the sulphide rich rock (AX), and the saprolite (ALCY).

Table 3.16: Summary of Sample Classification According to the AMIRA Classification Scheme

Class	Sub-class	Number of Samples	% of Samples
NAF		102	76%
PAF	PAF	17	13%
	PAF-LC	0	
UC	UC(PAF)	11	8%
	UC(PAF, high TOC)	0	
	UC(NAF)	4	3%

The AMIRA classification system does not readily lend itself to evaluating the individual lithologies because it relies on the NAG pH value and cannot be averaged for a lithological unit.

3.1.10.4 Summary

In summary, the results suggest that the available neutralisation potential is best indicated by the carbonate equivalent NP calculated from the inorganic carbon content and should be used for material classification. The results further suggest that while not all of the sulphide minerals may be equally reactive, most if not all appears to be available for acid generation. Therefore, the preferred parameters for determining acid generation potential appears to be sulphide sulphur equivalent acid generation potential and carbonate equivalent acid neutralization potential. Whilst the NAG test also effectively identifies net acid generating properties, it appears to be susceptible to false negatives due to incomplete sulphide oxidation within single step test.

In conclusion, the combined results suggest that about 70 – 75 % of waste material is expected to be non acid forming. About 8 % of the waste material is expected to potentially acid forming, but could be as high as 15 %. The potentially acid generating lithologies include the ferruginous chert (ANC_{RT}), feldspathic gneiss (undifferentiated) (ANFF), the pegmatites (APP), the sulphide rich rock (AX), and the schists. The acid generating properties of about 10 to 22 % of the waste material is uncertain. Further characterization of the materials that classify as uncertain is required, ideally through kinetic testing, to determine their potential for acid generation.

The screening tests, used in the classification of samples, were performed on pulverised samples and as a result most, if not all, of the reactive minerals would be available for oxidation and acid neutralization. For waste material, variations in particles size and the irregular fracturing of the waste would result in a different relative exposure of minerals and this may result in geochemical behaviour in the field not consistent with the classification based on laboratory conditions. Determination of the actual availability of the neutralization potential (and acid generation potential) requires kinetic testing to be undertaken at the actual size distribution of the waste material that will be produced. However, since it is not possible to generate waste material at an appropriate size distribution kinetic tests on smaller grained materials may be used to assess oxidation rates and potential effects on the acid generation properties.

Results for kinetic testing undertaken to date are presented and discussed in the next section.

3.2 Kinetic Test Results

3.2.1 Sample Properties

The samples were selected to represent a whole range of geochemical properties. The intent of the initial selection was to target samples within the uncertain range on the basis of NP (i.e. and NPR of 1 to 3) with the objective of firming the interpretation of the acid generation classification method described previously. The NPR based on NP ranged from about 1.1 to about 1.8 as shown in Table 3.17. One sample (SRK006) was selected at a low sulphur content, clearly non acid forming, to assess the potential of solute release from a net neutral sample. However, at the time of sample selection not all of the test results were available for assessment and as the preceding discussion indicated, the carbonate NP is likely a more accurate measure of the actual available neutralization potential. Based on the NPR calculated for the CarbNP, all samples except SRK006 and SRK075 has an NPR of less than 1. The sample properties are also illustrated in Figure 3.4. As shown, only one sample falls within the uncertain range, one sample is above the CarbNP NPR of 3, and the remaining samples are generally biased toward net acid generation. Therefore while the tests have limited value with respect to establishing a transition between an acid forming and non-acid forming NPR, they will nonetheless provide essential information with respect to rates of oxidation, acid generation, acid neutralization and solute release.

Table 3.17 Properties of Samples Selected for Kinetic Testing

Test	Sample	Unit	NP	CarbNP	ABCC (pH 6)	S(T) (%)	MPA	NAG	NAPP CarbNP	NPR		
										NP	CarbNP	ABCC
1	SRK003	ANC RT	11	< 0.8	-	3.56	109	94	109	0.1	0.01	-
2	SRK006	ANG	171	90.4	-	0.13	4	0	-86.4	38.0	20.10	-
3	SRK033	ANFF	62	27.2	9	1.11	34	0	6.8	1.8	0.79	0.26
4	SRK051	ANFF	65	24	-	1.60	49	0	25	1.3	0.49	-
5	SRK054	ANFQ	50	17.6	-	1.21	37	8	19.4	1.3	0.47	-
6	SRK075	ANC RT	104	71.2	23	1.83	56	0	-15.2	1.8	1.26	0.41
7	SRK077	ANF	56	24.8	18	1.70	52	0	27.2	1.1	0.47	0.34
8	SRK088	AX	55	21.6	16	1.34	41	10	19.4	1.3	0.52	0.39

Note: NP, CarbNP, NP(ABCC), MPA, NAG and NAPP in units of kgH_2SO_4/tonne

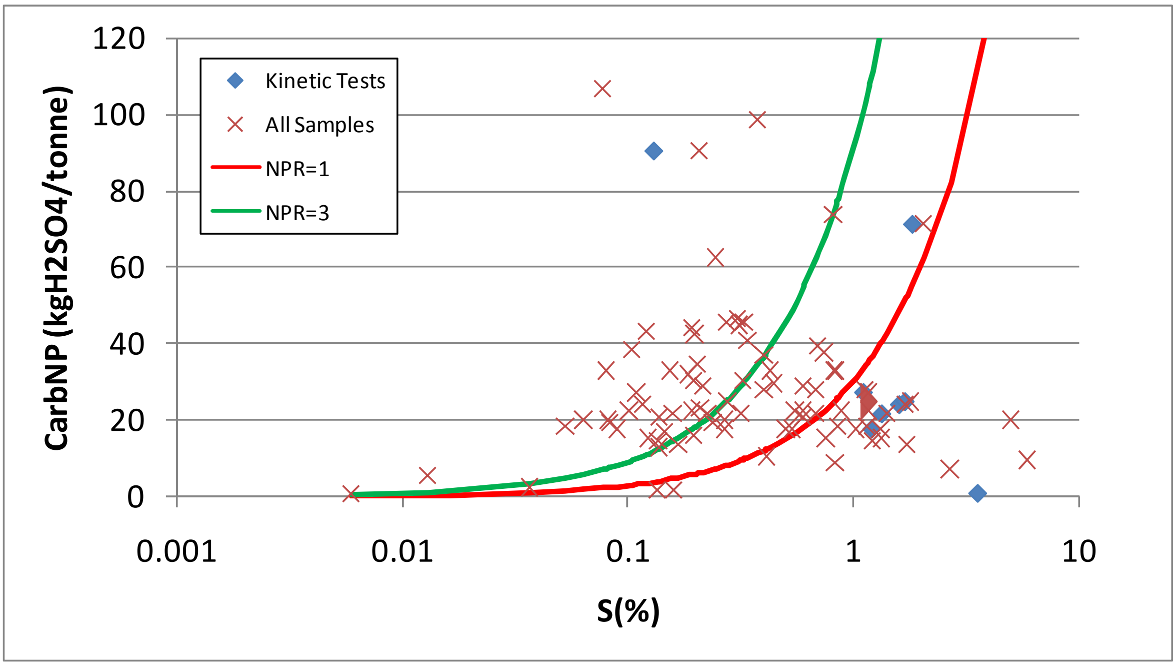

Figure 3.4 Kinetic Test Sample Classification Relative to All Samples

3.2.2 Results and Discussion

At the time of writing, complete data for the first 32 weeks of kinetic testing were available. The complete results together with plots of selected parameters are presented in Appendix E. The following sections briefly present and discuss key results to date.

3.2.2.1 Acid Generation and Neutralization

The leachate pH values for consecutive leach cycles are illustrated in Figure 3.5. As shown in the time-series plot, all samples but SRK003 and SRK 0075 remain in the near neutral pH range indicating buffered pH conditions.

Sample SRK003 (ferruginous chert) rapidly acidified, which is consistent with its low CarbNP.

Sample SRK075, also representing ferruginous chert, remained near neutral in pH for about 28 weeks and the results suggest that the test may have entered the early stages of acid generation. However, the sulphate to (calcium + magnesium) molar ratio remains at or below a value of one (see plots provided in Appendix E) which indicates that not all of the carbonate minerals had been depleted from the sample.

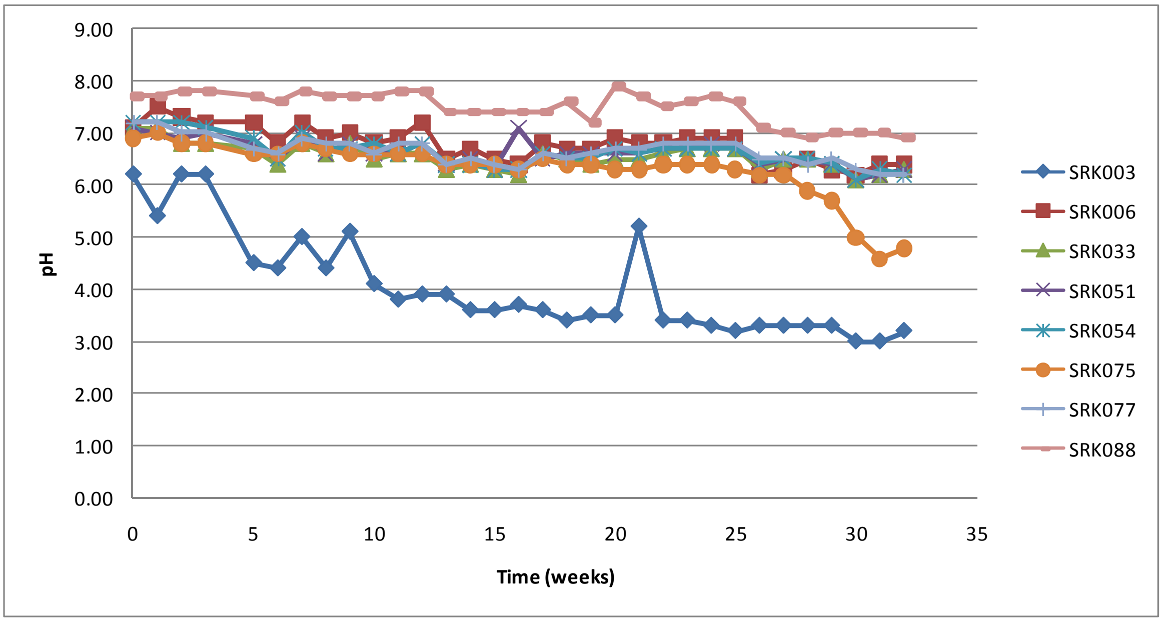

Figure 3.5 Consecutive Leachate pH Profiles for Kinetic Tests

The sulphate concentrations over time in the kinetic test leachate are shown in Figure 3.6 (note the logarithmic scale on the y-axis). As shown, all the tests showed an initial 'flush' of sulphate after which the concentrations decreased. This flush represents the removal of oxidation products from the samples that accumulated while the samples were in storage. Subsequently, as indicated by the sulphate concentrations, the oxidation rates in most samples remained relatively consistent except for SRK003, SRK075 and SRK088. These three samples have been showing consistently increasing concentrations over time, and as shown, the sulphate release rates (and hence oxidation rates) have as yet not reached a maximum value. The results further suggest that the oxidation rates for samples SRK054 and SRK077 may be increasing (based on final sulphate concentrations).

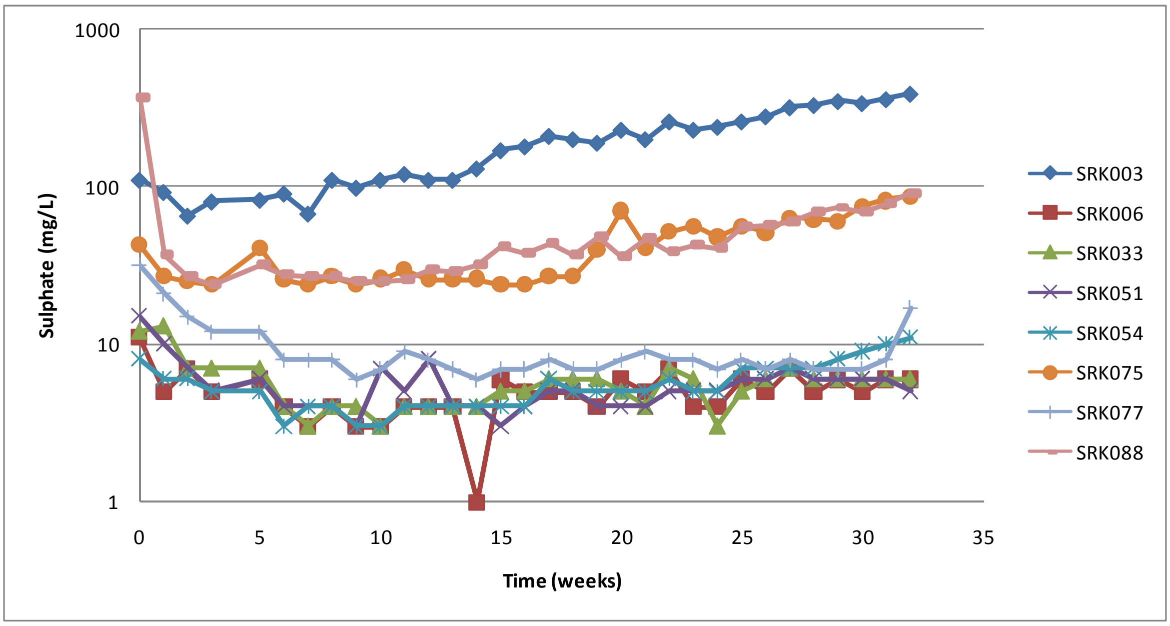

Figure 3.6 Sulphate Concentrations in Kinetic Test Leachates

As noted before, sample SRK077 appears to have commenced early stages of net acid generation even though the carbonate neutralization had not yet been depleted. The increasing rate of oxidation however may mean that the rate of acid generation has reached a point where the dissolution of the carbonate minerals is being overwhelmed, possibly due to a difference in the type of carbonate minerals present. To further investigate this, the average calcium to magnesium molar ratios in the leachates were calculated for each of the tests as shown in Table 3.18. (complete results together with time series plots are provided in Appendix E).

Table 3.18 Summary of Average Calcium to Magnesium Molar Ratios

Test	Sample	Unit	Ca/Mg
1	SRK003	ANC_{RT}	0.34
2	SRK006	ANG	6.15
3	SRK033	ANFF	2.36
4	SRK051	ANFF	5.36
5	SRK054	ANFQ	8.69
6	SRK075	ANC_{RT}	1.12
7	SRK077	ANF	3.97
8	SRK088	AX	3.07

The results indicate a clear difference amongst the different samples. The samples that are being buffered effectively in the pH 7 range all have a high ratio indicating dissolution of a predominantly calcitic carbonate phase. However, the ratio for sample SRK075 is close to unity suggesting a dolomitic carbonate phase, which would be consistent with a slower rate of dissolution and acid neutralisation.

Recognizing that oxidation rates have as yet not stabilised, the calculated oxidation rates based on the most recent cycles of sulphate release were used to estimate the rate of sulphide depletion. Rates of CarbNP consumption were correspondingly calculated from the calcium and magnesium release. The results are summarised Table 3.19. Assuming that the current rates will be maintained, the results indicate that the CarbNP will be depleted well in advance of the depletion of the acid generation potential for all samples except for Sample SRK006. The samples for which the CarbNP would be depleted in advance of the AP are therefore expected to become acidic.

Table 3.19 Summary of Acid Neutralisation and Generation Rates

Test	Sample	Unit	S(T) (%)	CarbNP Depletion		AP Depletion	
				Rate*	Time (yrs)	Rate*	Time (yrs)
1	SRK003	ANC $_{RT}$	3.56	0.0432	0	0.159	13
2	SRK006	ANG	0.13	0.00629	276	0.00250	35
3	SRK033	ANFF	1.11	0.00689	76	0.00263	251
4	SRK051	ANFF	1.60	0.00354	130	0.00258	363
5	SRK054	ANFQ	1.21	0.00795	43	0.00417	171
6	SRK075	ANC $_{RT}$	1.83	0.0643	21	0.0333	33
7	SRK077	ANF	1.70	0.00392	122	0.00315	320
8	SRK088	AX	1.34	0.0595	7	0.0262	30

Note: CarbNP and AP depletion rates are in units of kgH_2SO_4/t/week

The results also indicate that the rate of oxidation is related to pH conditions and sulphur content, generally increasing with increasing sulphur content and decreasing pH.

3.2.2.2 Solute Leachability

As with oxidation rates, solute release rates have not yet stabilised. Solute release rates calculated based on the most recent cycles are summarised in Table 3.20. Key findings from the results to date include:

- Aluminium and copper release rates are pH related and increase with decreasing pH (e.g. SRK003 as shown in Figure 3.7 and Figure 3.8), and in Figure 3.9 which illustrates the aluminium and copper results for SRK003.

- Arsenic release occurs at near neutral pH conditions and is highest in the non acid forming test SRK006 (see Figure 3.10)

- Manganese release is variable and is pH related (SRK003) (see Figure 3.11 and Figure 3.12)

The solute release rates along with the oxidation rates will be used in a later section to assess potential concentrations in percolate from the waste material.

Table 3.20 Summary of Solute Release Rates

Element	Units	SRK003 ANC RT	SRK006 ANG	SRK033 ANFF	SRK051 ANFF	SRK054 ANFQ	SRK075 ANC RT	SRK077 ANF	SRK088 AX
SO4	mg/kg/wk	156	2.4	2.6	2.6	3.9	31	3.0	25
Ca	mg/kg/wk	3.9	2.2	1.1	1.2	1.5	6.5	1.3	11.7
Mg	mg/kg/wk	7.8	0.2	0.3	0.1	0.1	4.4	0.2	1.5
Al	mg/kg/wk	1.5	0.0077	0.0077	0.0079	0.0043	0.0043	0.0042	0.045
Sb	mg/kg/wk	0.000044	0.00072	0.00026	0.00069	0.00018	0.00062	0.00029	0.00064
As	mg/kg/wk	0.0076	0.026	0.0031	0.0027	0.0020	0.0019	0.0028	0.020
Cd	mg/kg/wk	0.014	0.000085	0.00012	0.000088	0.00052	0.00023	0.000084	0.00012
Co	mg/kg/wk	0.37	0.00043	0.00043	0.00044	< DL	0.024	0.00042	0.00046
Cu	mg/kg/wk	0.085	0.0042	0.0043	0.0044	0.0043	0.0043	0.0042	0.0033
Fe	mg/kg/wk	57.2	0.0042	0.0043	0.0044	0.0043	0.074	0.0042	0.019
Pb	mg/kg/wk	0.0062	0.0021	0.0035	0.0033	0.0028	0.0023	0.002	0.0016
Mo	mg/kg/wk	0.00040	0.00023	0.010	0.00086	0.00029	0.00021	0.0012	0.012
Ni	mg/kg/wk	0.087	0.0042	0.0043	0.0044	0.0043	0.0060	0.0042	0.0033
Se	mg/kg/wk	0.0053	0.0021	0.0022	0.0022	0.0022	0.0023	0.0021	0.0037
Zn	mg/kg/wk	0.46	0.0060	0.0086	0.0088	0.0086	0.14	0.0093	0.0079

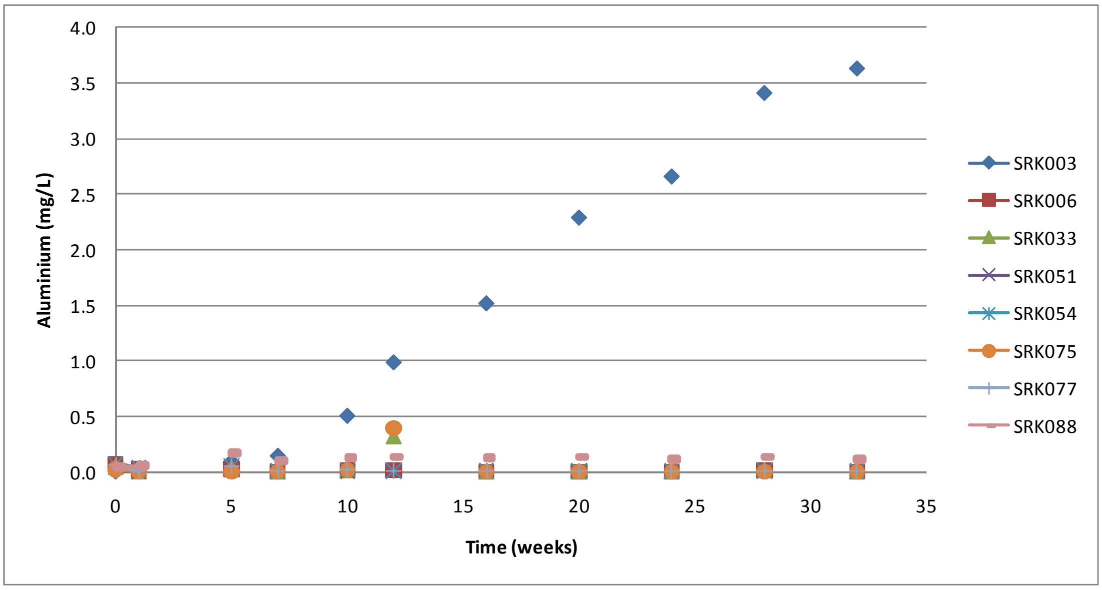

Figure 3.7 Aluminium Concentrations in Kinetic Test Leachates

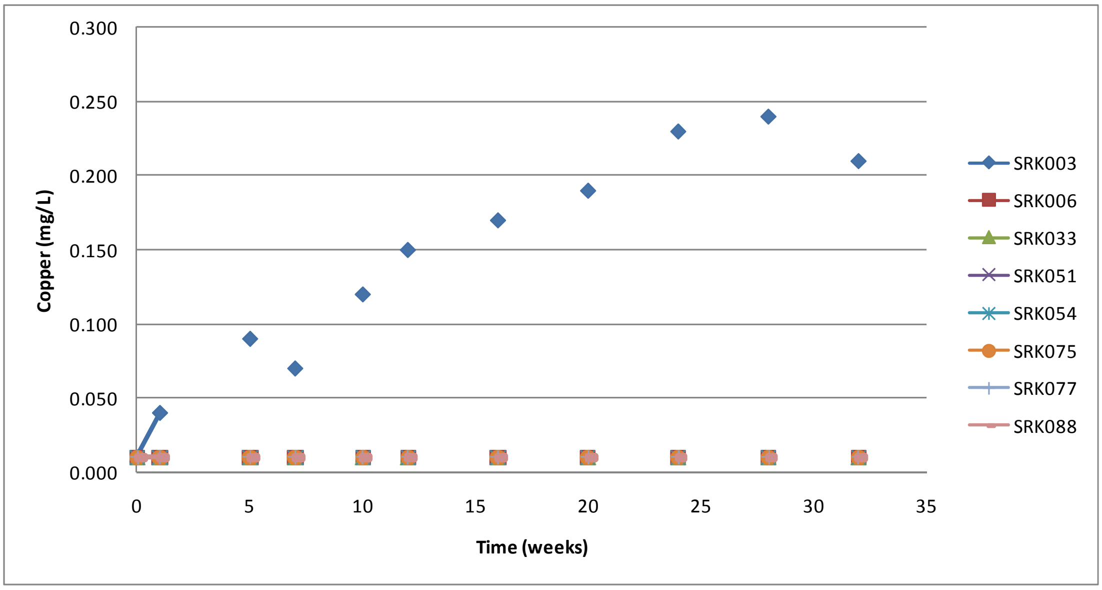

Figure 3.8 Copper Concentrations in Kinetic Test Leachates

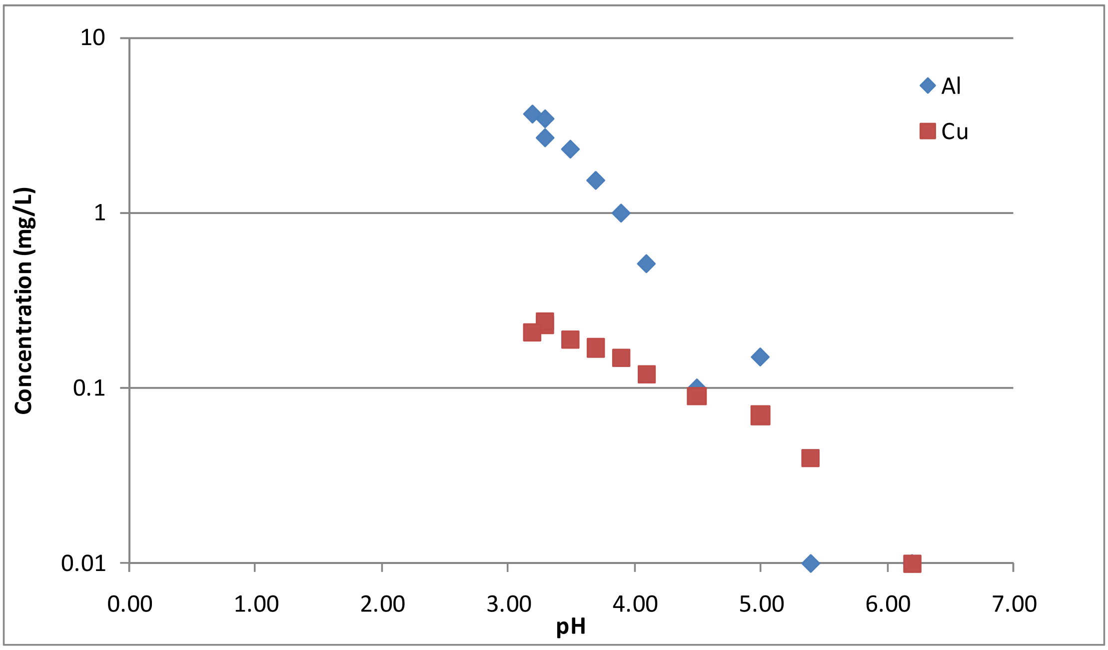

Figure 3.9 Aluminium and Copper Concentrations as a function of pH (SRK003)

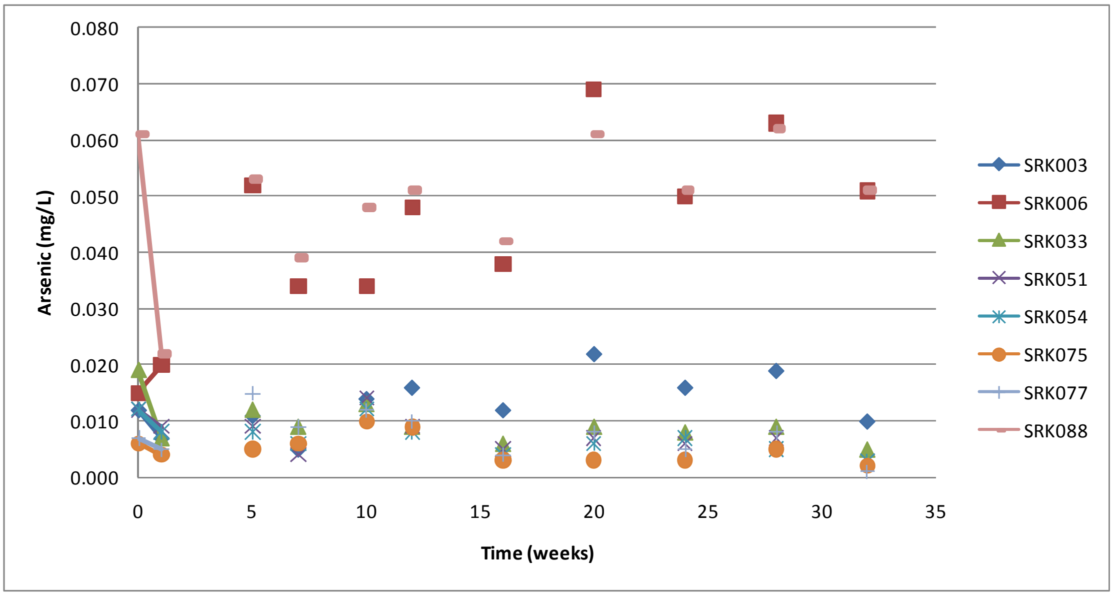

Figure 3.10 Arsenic Concentrations in Kinetic Test Leachates

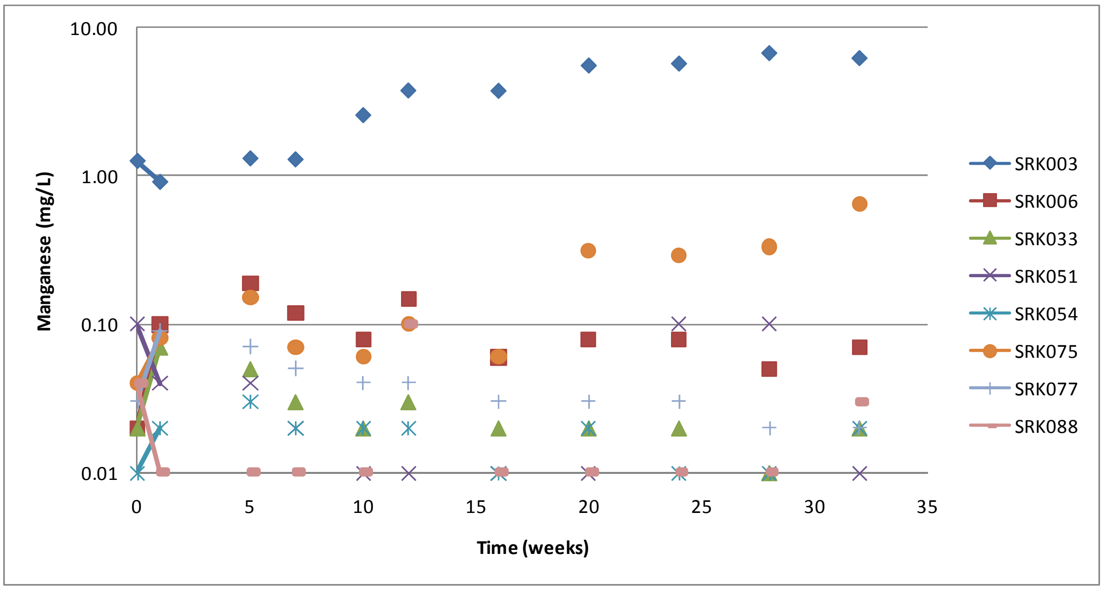

Figure 3.11 Manganese Concentrations in Kinetic Test Leachates

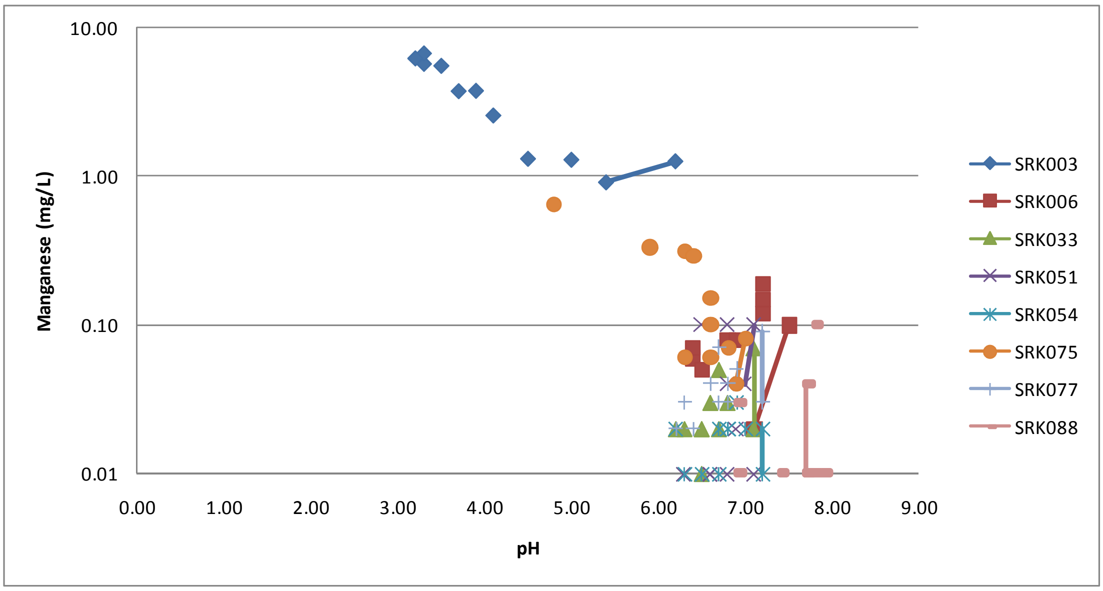

Figure 3.12 Manganese Concentrations as a Function of pH

4 Potential Percolate Water Quality

4.1 Introduction

This chapter examines the potential water quality that may be generated from the waste material. Since the waste characterization has shown that some proportion of the waste material has a potential to generate acid, some waste management practices will need to be implemented to manage or prevent acid generation. Clearly there is an interrelation between waste management (i.e. what is being done to prevent acid generation) and the water quality that will result from the landform. Therefore to develop the water quality predictions it is necessary to understand the waste management strategy that will be implemented. Ideally the several iterations would be carried out by which a waste management strategy would be proposed for which water quality predictions would be carried out and the resultant impacts be assessed to determine whether or not an acceptable outcome has been achieved. If not, then the proposed strategy would be revised and re-assessed until an acceptable outcome is predicted. However, to be able to develop suitable waste management strategies requires a good understanding of the quantity of each lithological unit that will be produced, when it will be produced (i.e. schedule of waste production to understand spatial placement in the waste material landforms) to allow an assessment of interaction between, for example, acid generating and acid consuming waste material. Waste production schedules are not available and will only be produced for the feasibility study, thus the spatial distribution cannot be determined as yet.

It is also necessary to understand how much, and how, water will move through the waste material as well as the ingress of oxygen. Modelling of all of these aspects require detailed physical and geochemical properties of the waste material. At least from a physical perspective, it is difficult to determine, for example, factors that will impact oxygen ingress to the waste material landform on the basis of drill samples alone. Fracturing during blasting will determine mineral exposure and size distribution and cannot be determined accurately without the benefit of actual operational waste material data. Therefore, for the current assessment, simplified but conservative assumptions will be adopted in the assessment.

4.2 Climate

The site climate data are best represented by the climate observations at Balgair and Laverton. Key statistical climate data are summarised in Table 4.1.

Balgair is located near the southern coast of Western Australia. The annual mean temperature is 26 degree Celsius. Its monthly mean maximum temperature is 47.6 degree Celsius. The annual average rainfall is 272.9mm. The lowest rainfall usually occurs between July and October. The annual evaporation for Balgair is approximately 2565mm. The area has an average relative humidity of 57% in the morning which decreases to 36% in the afternoon.

Laverton is located near the centre of Western Australia. The town’s mean annual temperature is 27.3 degrees and the monthly mean maximum temperature is 46.1 degree Celsius. The average rainfall annually is 232.8mm, is usually highest between January and June, and decreases during July. The average annual evaporation for Laverton is approximately 3265mm. The area has the average relative humidity of 46% in the morning which decreases to 30% in the afternoon.

Table 4.1 Summary of Rainfall and Evaporation Data for Balgair and Laverton

	Balgair			Laverton		
Month	Mean rainfall (mm)	Highest rainfall (mm)	Evaporation (mm)	Mean rainfall (mm)	Highest rainfall (mm)	Evaporation (mm)
Jan	20.2	102	350	24.4	179	500
Feb	27.3	130.6	300	30	233.6	380
Mar	29.6	99.8	260	30.4	181	340
Apr	21.4	62.6	175	22.5	204.5	225
May	22.5	80.4	120	23.7	123.8	150
Jun	25.1	92.7	85	24	126.2	105
Jul	17	43	95	16.4	66.1	115
Aug	18.3	54.8	125	13.5	84.8	150
Sept	16	61.2	170	8.1	67.3	220
Oct	16.2	50.4	240	8.3	57	300
Nov	23.9	76.8	285	14.1	152	350
Dec	36.2	167.6	360	17.6	134.6	430
Annual	272.9	518.8	2565	232.8	525.6	3265

As shown in the table, the project is located in an area where evaporation greatly exceeds rainfall. Rainfall can also vary significantly with the highest recorded annual rainfall about double the annual average. The lowest annual rainfall recorded for Laverton is 65.6 mm and that for Balgair is 140.7 mm.

Runoff in the area is estimated to be about 1.5 to 1.7 % of mean annual precipitation (Australian Government, National Water Commission). Recharge to the waste material landforms is expected to vary over the life of the dump. Initial infiltration rates are expected to be high due to the coarse nature of the waste material. With compaction (trafficking by heavy vehicles) and as the waste material weathers and slakes net infiltration is expected to decrease.

4.3 Waste Landform Construction

The proposed project is expected to produce up to 776 million tonnes of waste material. The waste will be placed lifts to a height of 10 m and 15 degree batters without berms. The overall height of the dumps will be limited to elevations that blend in with the surrounding topography and is expected to not exceed 375 m RL (average height 35 m). The proposed waste landforms will have a footprint of up to 1200 Ha.

At closure TGP plans to place a final cover of up to 1 m of sediments and topsoil which will be graded to 15 degrees and will be revegetated.

Currently, scheduling of the waste material is not available. Therefore further assessment of the waste landform will be based on a ‘bulk properties’ assessment.

4.4 Waste Material Infiltration

In arid and semi-arid areas, the natural recharge (i.e. the amount of precipitation that enters the ground profile and contributes towards replenishing of the groundwater) is an indicator of the potential net infiltration to the waste material landform. Scanlon et al. (2006) carried out an extensive international review of recharge rates in arid and semi-arid environments and concluded that on average recharge rates in these regions, if undisturbed, range between 0.1 and 5% of the long-term annual precipitation. This observation is supported by data presented by Xu and Beekmann (2003), which suggest that in arid and semi-arid regions of South Africa and Botswana the annual recharge is between 0.1 and 18%, but closer to about 1% or less for areas with mean annual precipitation close to the 260 mm experienced at the project site. The magnitude of the natural recharge is expected to be less than 1 % (e.g. in some areas near Kalgoorlie estimates of recharge have been in the order of 0.5 % or less, from the Water 2010 model by jurisdiction for 2004-05 (Source: Bureau of Rural Sciences)).

Factors that may influence net infiltration into waste material landforms, although numerous, may be categorized broadly as follows:

- atmospheric boundary conditions, i.e. climate,
- waste material physical, hydraulic and chemical properties, and
- pile construction technique, which in turn relates to internal pile structure.

Although for most part available data reported in the literature as referenced above are i) anecdotal, ii) indirectly derived or iii) theoretically estimated, net infiltration as a fraction of annual precipitation decreases significantly as the site precipitation decreases.

The waste material landforms will consist of run-of-mine waste, which will consist of overburden sedimentary and basement material. Actual grain size distribution will vary according to material type. Considering the range of geological regimes within the proposed pit/s, as well as the mine sequencing, the waste material landform is expected to be heterogeneous, which in turn means that net infiltration would not be constant over the entire area of the waste landform. In some areas the infiltration both during operations and after closure could be managed through the selective placement of material or material blending.

The internal structure of a waste material landform is to a large extent defined by the method of construction. Conventional truck end-dumping results in physical material segregation and layering, which in turn will result in preferential flow within the waste landform (i.e. not all of the waste will be contacted by the infiltrating water (Hockley et al., 1996)).

Conventional waste landform construction results in the surface of each bench being continuously compacted by the wheels of the loaded haul trucks, and that the only un-compacted waste material exposed at any given time would be the angle of repose side slopes. At the planned nominal height of 375 mRL (avg. ~35m high), the final footprint of the waste material landform will be at most 1200 ha. This means that when mining ceases, the greatest proportion of the landform will have been compacted whilst the planar un-compacted side slope surface area of the landform will be about 10 to 15% of the total footprint.

For the most part the in-situ moisture content of waste material when placed will be at a gravimetric moisture content of about 2 to 5%. With field moisture capacities ranging up to 15 % this means that the waste material will have a large capacity to take up water before it will actually release seepage water at the base. Considering the low rainfall and low recharge expected for the area, this could mean a delay of decades to centuries before the seepage would enter the groundwater system. However it is possible that some seepage could occur due to selective flowpaths (Williams and Rhode, 2008).

Actual data for infiltration rates into waste landforms are extremely scarce, and when data are published it is often very difficult to definitively determine the accuracy of the data. None of these case studies are, however, in a climate regime similar to the proposed project, i.e. they were all located in higher precipitation zones, with lower evaporation rates. Data from uncovered heap leach pads in Nevada, USA, suggest net infiltration rates range from 12 to 21% (Rykaart et al, 2006). The precipitation regime at these sites was, however, still higher, and the evaporation lower, than that at project location. The actual infiltration at the site is therefore likely to be much less and anticipated to approach levels of regional infiltration.

In conclusion, an appropriate upper range benchmark net infiltration rate, based on published waste material landform net infiltration rates, is less than 6%. Preferential flow is likely to occur as a result of the landform construction method (Williams and Rhode, 2008). Furthermore, based on the results of uncalibrated numerical modelling, and published benchmarking data, it is reasonable to conclude that preferential placement of suitable material combined with trafficking could reduce net infiltration to close to regional recharge rates, with the understanding that breakthrough seepage events could occur occasionally.

4.5 Acid Generation Potential

A summary of the acid generation and neutralisation properties is provided in Table 4.2 and were used to calculate the overall mass weighted properties for all of the waste material. As shown in the last row of the table, the weighted average carbonate neutralization potential is about 19 kg H_2SO_4/tonne; the acid generation potential is about 9 kg H_2SO_4/tonne, and the CarbNP NPR is about 2.1. The results indicate that, overall, the waste material is likely to contain sufficient neutralization capacity to neutralise all of the acid that may be generated, provided the waste material is fully mixed and that the CarbNP is available to neutralize the acid generated.

Whilst the majority of the waste is expected to be non-acid forming (70 to 75 %), as indicated by the results and discussed in the previous chapter, a small portion of the waste will have a potential to generate acid (8 %), and the acid generation properties of the balance of the waste material is uncertain. Some fraction of the uncertain materials will likely generate acid at varying degrees. Nonetheless, some of the non-acid forming materials will have excess capacity to neutralize acid and may be utilised to mitigate the effects of acid generation. The units of greatest value with respect to acid neutralisation comprise the Archaean amphibolitic gneiss (ANA), Proterozoic dolerite intrusive (PPD), the garnet gneiss (undifferentiated) (ANG) and the Schists (biotite) (AZB) as they have the greatest excess neutralization capacity. However, when considered on relative abundance (mass weighted distribution), about 32 % of the excess neutralization capacity is associated with the Garnet gneiss (undifferentiated) (ANG), 20 % with the Garnet Gneiss (amphibole-rich) (ANGA), 11.5 % with the Tertiary cover (TL) materials, 7.7 % with the Proterozoic dolerite intrusive (PPD) and only 5.5% is associated with the Archaean amphibolitic gneiss (ANA).

Table 4.2 Summary of Mass Weighted Average Acid Generation Properties

Unit	CarbNP	AP	NAPP	NPR CarbNP	Weight Distribution
	kgH_2SO_4/t	kgH_2SO_4/t	kgH_2SO_4/t		%
ALCY	2	1	-1	2.0	13.8
AN?	1	1	0	1.0	1.7
ANA	62	4	-58	15.5	1.2
ANC RT	10	107	97	0.1	1.8
ANF	22	17	-5	1.3	7.5
ANFA	21	5	-16	4.2	6.6
ANFF	15	30	15	0.5	6.2
ANFQ	21	14	-7	1.5	8.1
ANG	41	5	-36	8.2	11.2
ANGA	19	6	-13	3.2	18.3
ANGQ	18	3	-15	6.0	-
APP	3	12	9	0.3	0.2
AX	21	95	74	0.2	0.05
AZ	31	17	-14	1.8	2.7
AZB	41	7	-34	5.9	-
AZC	14	16	2	0.9	-
AZS	39	18	-21	2.2	-
MS	1	1	0	1.0	0.8
PPB	25	6	-19	4.2	0.9
PPD	46	7	-39	6.6	2.5
QLSD	3	0	-3	10.0	4.8
TL	18	0	-18	60.0	8.1
Weighted Average	**19**	**9**	**-10**	**2.0**	**96.5**

The Tertiary cover (TL), whilst containing a lower neutralization capacity, may be best utilised as a cover material. The ferruginous chert (ANC_{RT}), the sulphide rich rock (AX) and the feldspathic gneiss (K-fld >> qtz) ANFF (about 8 % by wt of the materials) contain the majority of the acid generation potential. This material would be blended with NAF, to minimise the risk of acid generation. The material would also not be placed in the outer 10m shell of the waste landform.

4.6 Assignment of Oxidation and Leach Rates

Recognizing that the oxidation rates and solute leach rates have not yet stabilised, and have been determined primarily for more mineralised (i.e. materials that are expected to become net acid generating) which are expected to become acidic, using the data to infer oxidation rates and solute release from the balance of the materials may result in an overestimation of solute release rates for some non-acid forming materials while solute release rates for net acid generating materials may be underestimated. Nevertheless the data can be used to complete water quality predictions to provide a starting point for determining potential impacts and waste management requirements. First, the results clearly indicate a low rate of oxidation for circum-neutral pH conditions, and second there is an apparent correlation with sulphide sulphur content. These relationships can be used to develop conservative estimates of oxidation and solute release rates based on their average geochemical properties and the acid generation potential classification.

The oxidation rates can be subdivided into three distinct rates (see Table 3.20). First, the samples at neutral pH are oxidising at a rate of about 3 $mgSO_4$/kg/wk. Second, the sample that is clearly acidic is oxidising at a rate of about 160 $mgSO_4$/kg/wk. Finally, two samples are oxidising at an intermediate rate of about 25 to 30 $mgSO_4$/kg/wk.

For simplicity it was assumed that the lower oxidation rate (and solute release rates) can be applied to the samples that classify as non acid forming (NAF). This will be conservative considering that some of the units have very low sulphur contents. The intermediate rates were assumed to apply to the materials that classify as uncertain, whereas the rates for the acidic sample were assumed to apply to all potentially acid generating (PAF) samples. (Note that the lithological unit classification is based on the CarbNP.) The average solute release rates were calculated for each of these categories and used to calculate the overall mass weighted solute release rates for the waste material landform as a whole. These are summarised in Table 4.3. The three different categories can be clearly distinguished in the table.

Table 4.3 Summary of Assumed Solute Release Rates

Major Unit	Class	Wt Distrib.	Solute Release Rate (mg/kg/wk)														
			SO4	Al	Sb	As	Cd	Co	Cu	Fe	Pb	Mo	Ni	Se	Zn	Ca	Mg
ALCY	UC	13.80%	28.2	0.024	0.00063	0.011	0.00017	0.012	0.0038	0.046	0.002	0.0061	0.0046	0.003	0.072	9.1	3
AN?	UC	1.70%	28.2	0.024	0.00063	0.011	0.00017	0.012	0.0038	0.046	0.002	0.0061	0.0046	0.003	0.072	9.1	3
ANA	NAF	1.20%	2.9	0.0064	0.00043	0.0073	0.00018	0.00034	0.0043	0.0043	0.0028	0.0025	0.0043	0.0021	0.0082	1.5	0.19
ANC RT	PAF	1.80%	155.8	1.5	0.000044	0.0076	0.014	0.37	0.084	57	0.0062	0.0004	0.087	0.0053	0.46	3.9	7.8
ANF	UC	7.50%	28.2	0.024	0.00063	0.011	0.00017	0.012	0.0038	0.046	0.002	0.0061	0.0046	0.003	0.072	9.1	3
ANFA	NAF	6.60%	2.9	0.0064	0.00043	0.0073	0.00018	0.00034	0.0043	0.0043	0.0028	0.0025	0.0043	0.0021	0.0082	1.5	0.19
ANFF	PAF	6.20%	155.8	1.5	0.000044	0.0076	0.014	0.37	0.084	57	0.0062	0.0004	0.087	0.0053	0.46	3.9	7.8
ANFQ	UC	8.10%	28.2	0.024	0.00063	0.011	0.00017	0.012	0.0038	0.046	0.002	0.0061	0.0046	0.003	0.072	9.1	3
ANG	NAF	11.20%	2.9	0.0064	0.00043	0.0073	0.00018	0.00034	0.0043	0.0043	0.0028	0.0025	0.0043	0.0021	0.0082	1.5	0.19
ANGA	NAF	18.30%	2.9	0.0064	0.00043	0.0073	0.00018	0.00034	0.0043	0.0043	0.0028	0.0025	0.0043	0.0021	0.0082	1.5	0.19
ANGQ	NAF	-	2.9	0.0064	0.00043	0.0073	0.00018	0.00034	0.0043	0.0043	0.0028	0.0025	0.0043	0.0021	0.0082	1.5	0.19
APP	PAF	0.20%	155.8	1.5	0.000044	0.0076	0.014	0.37	0.084	57	0.0062	0.0004	0.087	0.0053	0.46	3.9	7.8
AX	PAF	0.05%	155.8	1.5	0.000044	0.0076	0.014	0.37	0.084	57	0.0062	0.0004	0.087	0.0053	0.46	3.9	7.8
AZ	UC	2.70%	28.2	0.024	0.00063	0.011	0.00017	0.012	0.0038	0.046	0.002	0.0061	0.0046	0.003	0.072	9.1	3
AZB	NAF	-	2.9	0.0064	0.00043	0.0073	0.00018	0.00034	0.0043	0.0043	0.0028	0.0025	0.0043	0.0021	0.0082	1.5	0.19
AZC	PAF	-	155.8	1.5	0.000044	0.0076	0.014	0.37	0.084	57	0.0062	0.0004	0.087	0.0053	0.46	3.9	7.8
AZS	UC	-	28.2	0.024	0.00063	0.011	0.00017	0.012	0.0038	0.046	0.002	0.0061	0.0046	0.003	0.072	9.1	3
MS	UC	2.50%	28.2	0.024	0.00063	0.011	0.00017	0.012	0.0038	0.046	0.002	0.0061	0.0046	0.003	0.072	9.1	3
PPB	NAF	0.80%	2.9	0.0064	0.00043	0.0073	0.00018	0.00034	0.0043	0.0043	0.0028	0.0025	0.0043	0.0021	0.0082	1.5	0.19
PPD	NAF	0.90%	2.9	0.0064	0.00043	0.0073	0.00018	0.00034	0.0043	0.0043	0.0028	0.0025	0.0043	0.0021	0.0082	1.5	0.19
QLSD	NAF	4.80%	2.9	0.0064	0.00043	0.0073	0.00018	0.00034	0.0043	0.0043	0.0028	0.0025	0.0043	0.0021	0.0082	1.5	0.19
TL	NAF	8.10%	2.9	0.0064	0.00043	0.0073	0.00018	0.00034	0.0043	0.0043	0.0028	0.0025	0.0043	0.0021	0.0082	1.5	0.19
Mass weighted release rates			24.6	0.14	0.00045	0.14	0.00045	0.0083	0.0013	0.035	0.011	4.7	0.0027	0.0036	0.011	0.0026	0.069

4.7 Estimated Percolation Rates and Quality

As discussed previously, the net infiltration rate to the waste landform is expected to be in the order of about 6 % of the annual precipitation. At an average annual precipitation of 270 mm, 6 % infiltration would equate to a rate of infiltration of about 16 L/m2/year.

Furthermore, as discussed before, selective flow paths are expected to form so that only a portion of the waste landform will be contacted by the flow. The proportion of waste that would be contacted would vary depending on the final size distribution. Typical fractions of waste contacted by infiltration reported in the literature range from about 10 % to as high as 50 %. For the purpose of this preliminary assessment it was assumed that about 30 % of the waste would be contacted by the flow.

In order to calculate the potential solute concentrations in the water it is also necessary to consider that the tests have been conducted on finely crushed samples. Most of the surface area, and therefore reactive area, is associated with the fines fraction of waste material. The actual proportion of fines will depend on the blasting intensity and frequency as well as the friability of the waste. The proportion of fines (< 10 mm) can range from as low as 5 % in very competent material to as high as 40 %. For the purpose of this assessment it was assumed that the fines will represent about 30 % (wt) of the waste.

A final consideration is the availability of oxygen. With end dumped waste material, typically the coarse waste accumulates at the base of a lift and the fines nearer the top. This results in layering of coarse and fine material that may provide ‘channels’ for advective oxygen transport. However, since TGP proposes to place a fine grained soil cover over the waste landform, the mechanism for advective oxygen transport would be restricted and diffusive transport is expected to control oxygen ingress. Preliminary calculations suggest that the depth of oxygen penetration would range from as low as 1 m for the more reactive materials to in excess of 5 meters for the less reactive materials. For the current assessment an oxidation depth of 3 m was adopted.

Based on the above assumptions, about 3 m of waste material would be in the oxidation zone. Considering a 1 m^2 column of waste material, about 16 L of water would pass through the waste material and contact about 30 % of the rock (i.e. 0.3 x 1.8 tonne/m^3 x 3 m^3 = 1.62 tonnes of waste material). Then correcting for the surface area, only about 30 % of the material would be reactive (i.e. 0.3 x 1.62 = 0.486 tonnes).

Subject to the above constraints, the mass weighted average solute release rates given in Table 4.3 were used to estimate potential concentrations in percolate from the waste material (i.e. mass of reactive rock contacted by flow x release per year / annual flow) to give an upper bound estimate. A second calculation (lower bound estimate) was completed assuming that the reactive PAF and UC materials could be isolated by several meters of NAF materials (i.e. they were excluded from the mass weighting calculations). In that event only the NAF materials would be reacting over time and the low end of the oxidation and solute release rates would apply. The results are summarised, in Table 4.4. (Note that the concentrations have been adjusted to reflect the formation of gypsum). The difference between the two sets of concentrations would reflect the effect of an effective waste material management strategy that would exclude PAF material from the surfaces of the landform.

As discussed previously, overall the waste material has a net excess of neutralization capacity which suggests that, if managed appropriately, neutral pH conditions could be maintained as a whole. It is possible however that localised some areas of acid conditions could exist.

Nevertheless, in the case of the lower bound it is almost certain that neutral conditions could be maintained in which case the pH would be buffered to about 7. In that event, the concentrations of a number of parameters would be lower than estimated as their solubility would be limited by the formation of secondary minerals. For example, as indicated by preliminary MINTEQA2 geochemical modelling, the concentration of aluminium would decrease to about 1 mg/L, copper to less than 0.5 mg/L due to the formation of hydroxide minerals. Lead solubility would be limited by the formation of lead sulphate. Furthermore, under oxidising and neutral pH conditions, the iron could oxidise to form iron oxy-hydroxides and its concentration could decrease to about 0.3 mg/L or less. The formation of the oxy-hydroxides could further lead to the adsorption or co-precipitation of elements such as nickel, molybdenum and arsenic.

With respect to the upper bound calculations, should neutral pH conditions prevail, then similar controls on solubility will prevail due to the formation of the secondary mineral phases.

Table 4.4 Summary of Estimated Percolate Quality

Parameter	Concentration (mg/L)	
	Upper Bound	Lower Bound
SO4	42618	2523
Al	238	11
Sb	0.79	0.076
As	14	13
Cd	2.3	0.30
Co	61	0.59
Cu	18	6.6
Fe	8210	7.4
Pb	4.6	3.4
Mo	6.2	0.69
Ni	19	7.4
Se	4.6	3.7
Zn	119	14
Ca	450	500
Mg	3153	326

The preliminary upper and lower bound concentration estimates may be used to assess potential impacts on groundwater quality. Since non-reactive materials will be used to place the proposed cover over the waste material landform, surface run-off water quality should not be impacted.

5 Conclusions and Recommendations

5.1 Conclusions

The results presented herein indicate that the carbonate equivalent neutralisation potential is the most appropriate measure of neutralisation capacity. The static test results indicate that the majority of the waste is likely to be non acid forming (about 70 %). However, a portion (about 8 % wt) of the waste material, comprising the ferruginous chert (ANC CRT), the sulphide rich rock (AX) and the feldspathic gneiss (fld >> qtz) (ANFF) is net acid generating. The balance of the waste is classified as 'uncertain'; some portion of this may become net acid generating. Overall however, the waste material is expected to have excess acid neutralising capacity.

The units of greatest value with respect to acid neutralisation comprise the Archaean amphibolitic gneiss (ANA), Proterozoic dolerite intrusive (PPD), the garnet gneiss (undifferentiated) (ANG) and the Schists (biotite) (AZB) as they have the greatest excess neutralization capacity. However, when considered on relative abundance (mass weighted distribution), about 32 % of the excess neutralization capacity is associated with the Garnet gneiss (undifferentiated) (ANG), 20 % with the Garnet Gneiss (amphibole-rich) (ANGA), 11.5 % with the Tertiary cover (TL) materials, 7.7 % with the Proterozoic dolerite intrusive (PPD) and only 5.5% is associated with the Archaean amphibolitic gneiss (ANA). The Tertiary cover (TL), whilst containing a lower neutralization capacity, may be best utilised as a cover material. Effective waste material management could allow neutral pH conditions to be maintained.

The kinetic test results have proceeded for 32 weeks and do not show steady state conditions as yet. Nevertheless, the results indicate that samples within the neutral pH range is oxidising at a low rate. The sample that is fully acidic is oxidising at a high rate. Oxidation rates appear to be related to sulphide content and pH conditions. The results further indicate that aluminium and copper release rates are pH related and increase with decreasing pH. Arsenic release occurs at near neutral pH conditions and manganese release is variable.

The oxidation and solute release rates were used to compile preliminary estimates of the potential range of solute concentrations that may result in the percolate from the waste material landform. These may be used to establish potential impacts on the local groundwater. The estimates also serve to illustrate the benefits that may result from active waste material management that may including the blending of NAF and PAF within the waste material landform.

5.2 Recommendations

The benefits of proactive waste material management are illustrated by the water quality estimates presented herein. SRK therefore recommends that once the waste material production schedule has been developed, the proposed waste material management strategy is revisited to confirm that the proposed isolation (placement of 10 m of NAF material on the outer surfaces of the landform) blending strategy for reactive waste is appropriate. The waste material management strategy should incorporate sampling in advance of mining to allow early identification potential problematic materials.

Once the actual placement schedule and composition (i.e. layering etc.) of the waste landform has been established, the percolate water quality should be reassessed using steady state production rates from the kinetic tests.

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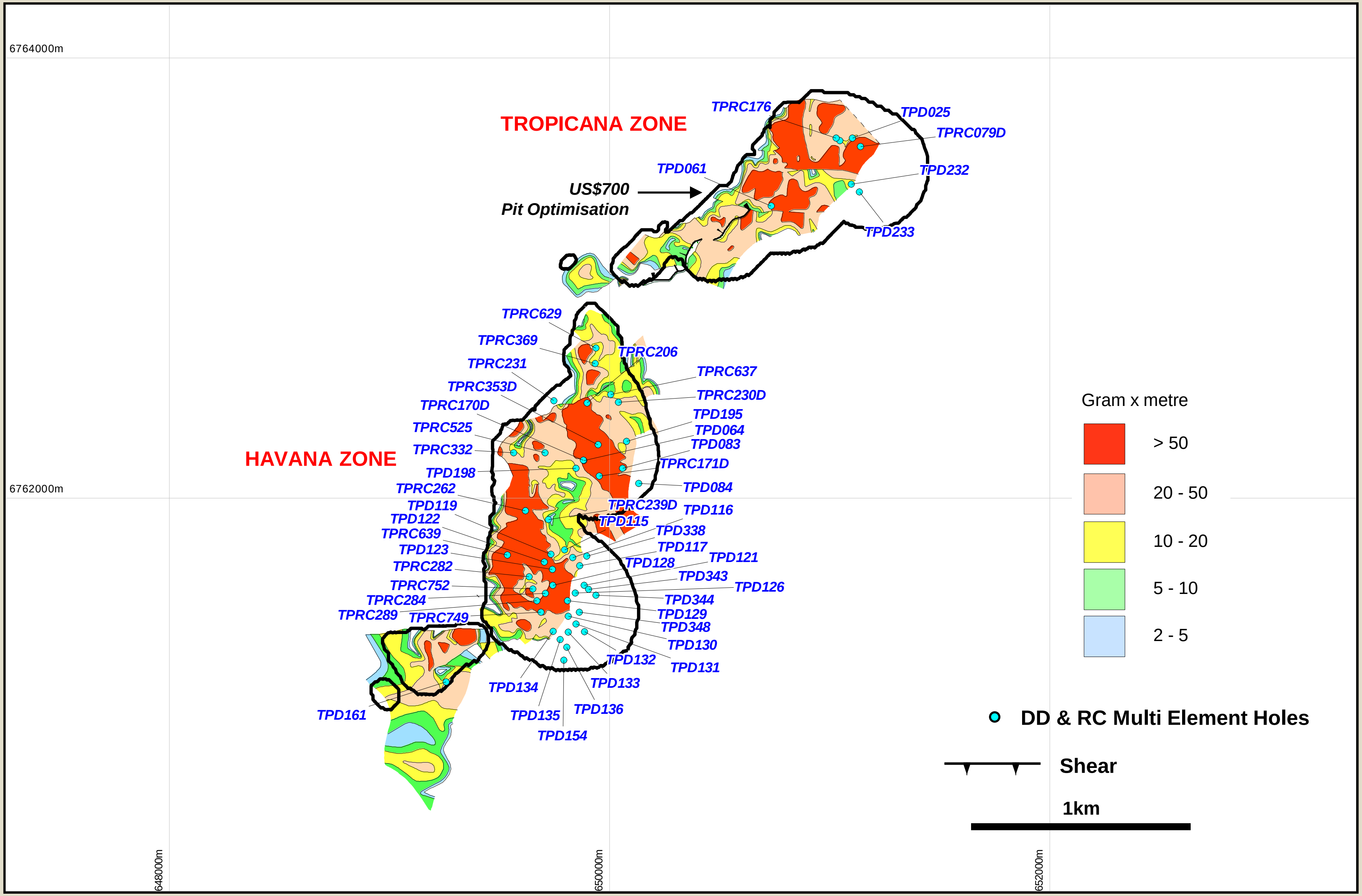
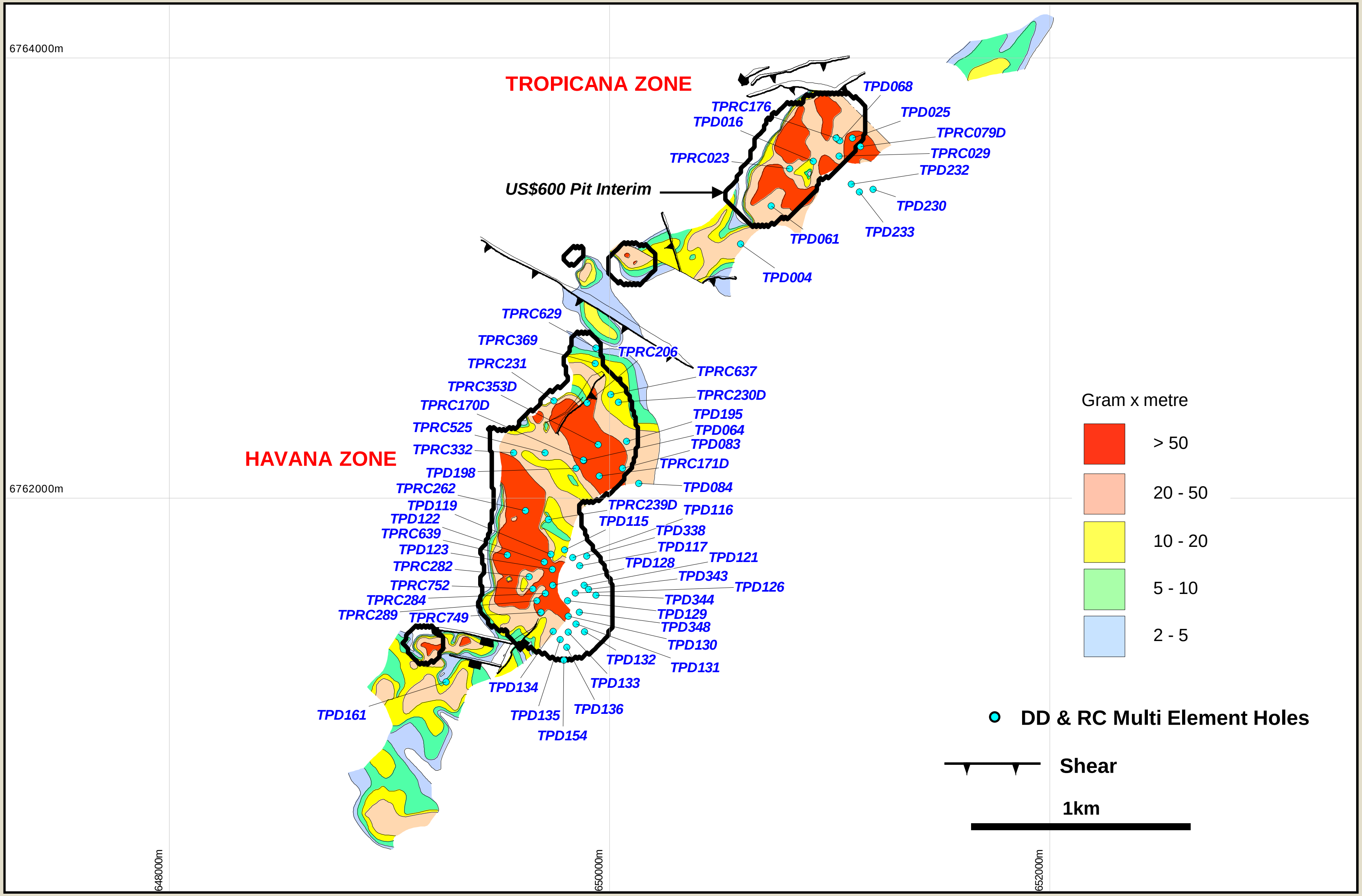
Appendices

Appendix A: Locations of Drill Hole Collars

ARD hole plan – January 2008



ARD hole plan – July 2007



Appendix B: Cross-sections Showing Locations of Samples

Cross Sections not included in version attached to the PER.

Files too large.

Appendix C: Testing Methods

STATIC TESTING METHODS

Paste pH and Paste EC

Paste parameters provide an indication of the degree of weathering the material has experienced as well as the availability of reactive mineral species and readily soluble salts. Generally, paste pH values less than pH 5 are indicative of stored acidity (i.e. stored oxidation products) and net acid generating conditions, whereas high paste pH values suggest the presence of reactive neutralising minerals.

These characteristics reflect the potential of a sample to impact the quality of water contacting the sample without the sample undergoing further chemical change/weathering. Such potential exists whether the sample is classified as NAF, UC or PAF. A method consistent with the AMIRA (2002) method was used.

Net Acid Producing Potential

The net acid producing potential (NAPP) is the theoretical balance between the capacity of the sample to generate acid via the oxidation of sulphides and its capacity to neutralise any acid formed. The maximum potential acidity (MPA) of the sample is calculated from the total sulphur content, assuming that all sulphur is present as pyrite.

The acid neutralisation capacity (NP) is measured by reacting the sample with a known amount of low pH hydrochloric acid. After the pH has stabilized the sample is back titrated with a base to determine the amount of acid that had been consumed by the sample, which is assumed to represent the NP.

The NAPP is calculated as follows:

$$NAPP = AP - NP \text{ (kg } H_2SO_4\text{/t)}$$

Where AP = 30.6 x S% and the sulphur content is expressed as weight percent (wt%).

The assumption that all sulphur in the sample is present as sulphide (pyrite) generally overestimates the amount of acid generated as sulphur will exist in other forms that are not acid generating (e.g. as sulphate, elemental sulphur and non acid generating sulphides). As both the total sulphur content and sulphate sulphur content of the sample were measured, it is possible to estimate the acid potential (AP) assuming that only the non sulphate sulphur is in the form of reactive pyrite (i.e. non sulphate sulphur = total S – sulphate S). The samples have therefore been classified using the non sulphate sulphur content rather than the total sulphur. In other words, the NAPP is calculated as follows:

$$NAPP = AP - NP \text{ (kg } H_2SO_4\text{/t)}$$

Net Acid Generation

Net acid generation (NAG) measures how a sample could behave under highly oxidising conditions. The sample is contacted with the strong oxidant hydrogen peroxide. The peroxide oxidises the sulphides contained in the sample which generates acid. Concurrently, neutralising minerals that may be present consume all or part of the acid generated. Following a predetermined contact time, the solution pH is recorded and the NAG acidity of the sample is quantified by titration with a base (sodium hydroxide).

Acid Neutralising Potential

The acid neutralisation potential is a measure of the role that gangue minerals could play in neutralising acid generated during sulphide oxidation. The neutralisation capacity of a sample can be sourced from both carbonate and silicate minerals. Calcium and magnesium carbonates are the most important contributors for rock types that generate acid at a high rate since they are very reactive and readily neutralise acidity at a high rate. Some carbonate minerals, such as iron and manganese carbonates, do not contribute to neutralisation. Other neutralising minerals such as silicates react at low pH values and will only contribute to the neutralising capacity after the leaching solution has become strongly acidic.

The endpoint pH after the addition of hydrochloric acid in the NP measurement is very low (typically about between pH values of 1 and 2) and leads to reactions that will occur only at a low pH (i.e. neutralisation due to dissolution of the silicate minerals). The NP measurement may therefore overestimate the neutralization capacity that is available. A more appropriate assessment of the NP that is available to maintain near neutral pH conditions is to infer the proportion of NP that is sourced from the calcium and magnesium carbonate minerals. The inorganic carbon content can be used to infer the carbonate mineral content and estimate the carbonate neutralization potential (CarbNP). Comparison of the CarbNP values with the NP values can give an indication of the proportion of the neutralising capacity of the sample that is due to the presence of carbonate minerals.

Geochemical Abundances

Bulk chemical assays were undertaken on all samples. The following elements were included in the assays:

- Major elements – Al, Ca, Fe, K, Mg, Mn, Na, P, S and Si; and
- Minor elements – Ag, As, Au, B, Ba, Be, Bi, C, Cd, Co, Cr, Cu, F, Hg, Mo, Ni, Pb, Sb, Se, Sn, Sr, Te, Th, Tl, U, V and Zn.

A direct comparison of the measured abundances of the elements was made with the average abundance of elements in the Earth's crust (Bowen, 1979). This provides the global abundance index (GAI) of elements and indicates which elements are 'enriched' in the sample with respect to the global average. The GAI is calculated using the following formula (Förstner, 1993):

$$\text{GAI} = \ Int\left(\log_2\left(\frac{\text{MeasuredConcentration}}{1.5\times\text{AverageAbundance}}\right)\right)$$

An example of GAI values is provided in the following table. In the table *n* is the ratio of the measured abundance in the sample to the reference material abundance.

Ranges of the Ratio of the Measured Concentration to Average Abundance (*n*) and the Corresponding Global Abundance Index

n range	GAI
$1 < n < 3$	0
$3 \leq n < 6$	1
$6 \leq n < 12$	2
$12 \leq n < 24$	3

Zero or positive GAI values indicate enrichment of the element in the sample when compared to average-crustal abundances. As a general rule, a GAI of 3 or higher signifies enrichment that warrants further evaluation.

Kinetic Testing Procedure

A modified AMIRA procedure (AMIRA, 2002) was utilised with the principle differences relating to the particle size at which the tests were completed and the flushing regime. The testing procedure was as follows.

Each sample was coarse crushed (<10mm) and placed in a large diameter Buchner filter lined with filter paper to retain the solids. The rock sample was then subjected to a weekly rinsing and drying cycle. Each week the sample was rinsed with about 300 ml of deionised water. The water was added to the top of the sample and allowed to drain under gravity and the leachate collected at the base of Buchner filter and submitted for analysis as follows:

- Weekly – pH, Electrical Conductivity (EC), sulfate, acidity and total alkalinity; and
- Every 3 to 4 weeks – Ag, Al, As, Ba, Be, Ca, Cd, Cl, Co, Cr, Cu, Fe, Hg, K, Mg, Mn, Mo, Na, Ni, P, Pb, Sb, Se, Sn, Sr, Th, Tl, U, V and Zn.

Generally column leach tests that exhibit slow rates of reaction require a minimum operating time of 40 to 50 weeks unless acidity conditions develop fully at an early stage of the test. The criteria that may be considered to assess whether testing should be discontinued include:

- pseudo steady state;
- Oxidation rates (i.e. acid generation rates) and neutralization potential depletion rates together with static test results indicate that net acid generating conditions are unlikely to develop, and metal leachability is unlikely to change in the future; and,
- A good understanding of rates of oxidation and leaching has been developed based on the available data.

Appendix D: Static Test Results

List of Tables

Table D-1: Paste pH and Conductivity Results

Sample ID	Zone	Hole ID	From	To	Interval	Major Unit	Classification	Paste pH	Paste EC mS/cm
SRK042	Havana	TPD128	12.0	17.0	5.0	ALCY	Waste	4.5	5.86
SRK081	Havana	TPRC231	39.0	41.0	2.0	ALCY	Waste	7.7	4.31
SRK1B001	Tropicana	TFRC577	45.0	50.0	5.0	ALCY	Waste	6.9	6.51
SRK1B001	Tropicana	TFRC577	45.0	50.0	5.0	ALCY	Waste	I/S	I/S
SRK1B003	Tropicana	TPRC123	25.0	30.0	5.0	ALCY	Waste	7	6
SRK1B036	Tropicana	TPRC788	14.0	16.0	2.0	ALCY	Waste	8.9	0.69
SRK1B042	Tropicana	TPRC124	21.0	23.0	2.0	ALCY	Waste	7.5	2.53
SRK1B044	Tropicana	TFRC578	16.0	17.0	1.0	ALCY	Waste	5.6	11.22
SRK037	Havana	TPD123	17.0	22.0	5.0	AN	Waste	5.4	5.77
SRK086	Havana	TPRC289	27.0	32.0	5.0	AN	Waste	7.8	5.72
SRK066	Tropicana	TPD232	145.0	150.0	5.0	ANA	Waste	8.8	1.69
SRK003	Tropicana	TPD025	128.0	131.0	3.0	ANC RT	Waste	5.3	7.13
SRK004	Tropicana	TPD025	128.0	131.0	3.0	ANC RT	Waste	5.3	6.42
SRK012	Havana	TPD115	158.0	163.0	5.0	ANC RT	Waste	8.3	1.87
SRK025	Havana	TPD121	165.0	168.0	3.0	ANC RT	Waste	7.5	1.11
SRK026	Havana	TPD121	173.4	174.6	1.3	ANC RT	Waste	8.1	1.29
SRK029	Havana	TPD121	212.1	212.6	0.5	ANC RT	Waste	8.4	1.44
SRK034	Havana	TPD122	21.0	24.0	3.0	ANC RT	Waste	4.4	4.67
SRK074	Tropicana	TPRC079D	148.0	150.0	2.0	ANC RT	Waste	5.5	7.04
SRK075	Havana	TPRC170D	143.0	147.0	4.0	ANC RT	Waste	8	2.32
SRK082	Havana	TPRC239D	81.0	86.0	5.0	ANC RT	Waste	7.8	0.88
SRK1B007	Tropicana	TPRC122	37.0	42.0	5.0	ANC RT	Waste	4.4	5.96
SRK1B029	Tropicana	TPRC807	64.0	66.0	2.0	ANC RT	Waste	4	5.15
SRK1B061	Tropicana	TPD219	140.0	143.0	3.0	ANC RT	Waste	7.6	5.47
SRK1B061	Tropicana	TPD219	140.0	143.0	3.0	ANC RT	Waste	I/S	I/S

Table D-1: Paste pH and Conductivity Results (cont.)

Sample ID	Zone	Hole ID	From	To	Interval	Major Unit	Classification	Paste pH	Paste EC mS/cm
SRK1B062	Tropicana	TPD221	183.0	186.0	3.0	ANC RT	Waste	7.8	3.91
SRK010	Havana	TPD083	268.0	273.0	5.0	ANF	Waste	9.5	1.16
SRK046	Havana	TPD130	178.0	183.0	5.0	ANF	Waste	9.4	1.09
SRK057	Havana	TPD135	120.0	125.0	5.0	ANF	Waste	9.3	1.28
SRK058	Havana	TPD135	125.0	130.0	5.0	ANF	Waste	9.5	1.55
SRK076	Havana	TPRC171D	203.0	208.0	5.0	ANF	Waste	8.5	1.33
SRK077	Havana	TPRC171D	255.0	260.0	5.0	ANF	Waste	8.2	2.35
SRK078	Tropicana	TPRC176	120.0	122.0	2.0	ANF	Waste	7.9	3.92
SRK079	Havana	TPRC206	104.0	109.0	5.0	ANF	Waste	7.9	3.2
SRK095	Havana	TPRC749	48.0	53.0	5.0	ANF	Waste	8.1	1.28
SRK005	Tropicana	TPD061	91.0	96.0	5.0	ANFA	Waste	7.1	3.3
SRK017	Havana	TPD117	216.0	221.0	5.0	ANFA	Waste	9.7	1.18
SRK020	Havana	TPD117	235.0	240.0	5.0	ANFA	Waste	9.6	1.32
SRK031	Havana	TPD121	240.0	245.0	5.0	ANFA	Waste	9.6	0.83
SRK045	Havana	TPD129	189.0	194.0	5.0	ANFA	Waste	9.4	1.13
SRK052	Havana	TPD132	226.0	231.0	5.0	ANFA	Waste	9.1	0.89
SRK059	Havana	TPD135	138.0	143.0	5.0	ANFA	Waste	9.7	1.39
SRK092	Havana	TPRC629	30.0	35.0	5.0	ANFA	Waste	8.3	1.98
SRK018	Havana	TPD117	223.0	227.0	4.0	ANFA-ANGA	Waste	9.8	0.98
SRK021	Havana	TPD117	245.0	250.0	5.0	ANFF	Waste	9.3	1.31
SRK022	Havana	TPD117	265.0	270.0	5.0	ANFF	Waste	8.8	1.14
SRK032	Havana	TPD121	260.0	265.0	5.0	ANFF	Waste	9.2	1.17
SRK033	Havana	TPD121	282.0	287.0	5.0	ANFF	Waste	9.1	1.27
SRK035	Havana	TPD122	121.0	126.0	5.0	ANFF	Waste	9.1	0.92
SRK036	Havana	TPD122	134.0	139.0	5.0	ANFF	Waste	9.2	1.07

Table D-1: Paste pH and Conductivity Results (cont.)

Sample ID	Zone	Hole ID	From	To	Interval	Major Unit	Classification	Paste pH	Paste EC mS/cm
SRK051	Havana	TPD132	200.0	202.0	2.0	ANFF	Waste	8.7	1.4
SRK056	Havana	TPD134	98.0	102.0	4.0	ANFF	Waste	8.5	1.08
SRK064	Havana	TPD198	144.0	149.0	5.0	ANFF	Waste	9.5	1.59
SRK070	Havana	TPD344	318.0	323.0	5.0	ANFF	Waste	9.1	2.45
SRK090	Havana	TPRC369	45.0	49.0	4.0	ANFF	Waste	8.2	1.84
SRK096	Havana	TPRC752	72.0	77.0	5.0	ANFF	Waste	8.2	2.1
SRK1B006	Tropicana	TFRC050	29.0	34.0	5.0	ANFF	Waste	8	4.98
SRK1B008	Tropicana	TPRC794	89.0	93.0	4.0	ANFF	Waste	8.6	1.65
SRK1B009	Tropicana	TPRC788	60.0	65.0	5.0	ANFF	Waste	7.4	4.56
SRK1B033	Tropicana	TFRC009	90.0	95.0	5.0	ANFF	Waste	6.9	3.04
SRK1B037	Tropicana	TPRC787	70.0	75.0	5.0	ANFF	Waste	8.5	1.77
SRK1B041	Tropicana	TPRC803	74.0	75.0	1.0	ANFF	Waste	7.7	4.59
SRK1B041	Tropicana	TPRC803	74.0	75.0	1.0	ANFF	Waste	8	3.9
SRK1B051	Tropicana	TPRC793	98.0	100.0	2.0	ANFF	Waste	7.6	4.03
SRK023	Havana	TPD119	152.0	157.0	5.0	ANFQ	Waste	9.4	1.15
SRK041	Havana	TPD126	211.0	215.0	4.0	ANFQ	Waste	8.6	1.07
SRK049	Havana	TPD131	205.0	210.0	5.0	ANFQ	Waste	9	1.49
SRK053	Havana	TPD132	239.0	244.0	5.0	ANFQ	Waste	9.2	0.64
SRK054	Havana	TPD132	249.0	254.0	5.0	ANFQ	Waste	8.7	1.03
SRK055	Havana	TPD133	226.0	231.0	5.0	ANFQ	Waste	9.2	1.12
SRK083	Havana	TPRC262	80.0	83.0	3.0	ANFQ	Waste	8.5	1.36
SRK084	Havana	TPRC282	40.0	45.0	5.0	ANFQ	Waste	7.9	1.82
SRK085	Havana	TPRC284	141.0	146.0	5.0	ANFQ	Waste	8.3	1.16
SRK1B010	Tropicana	TPRC817	92.0	97.0	5.0	ANFQ	Waste	7.6	4.91
SRK1B015	Tropicana	TPRC582	85.0	90.0	5.0	ANFQ	Waste	7.9	3.28

Table D-1: Paste pH and Conductivity Results (cont.)

Sample ID	Zone	Hole ID	From	To	Interval	Major Unit	Classification	Paste pH	Paste EC mS/cm
SRK1B017	Tropicana	TPRC793	124.0	126.0	2.0	ANFQ	Waste	8.6	1.71
SRK1B018	Tropicana	TPRC810	113.0	117.0	4.0	ANFQ	Waste	8.9	1.24
SRK1B028	Tropicana	TPRC811	127.0	132.0	5.0	ANFQ	Waste	8.1	7.48
SRK1B030	Tropicana	TPRC795	101.0	102.0	1.0	ANFQ	Waste	8	1.9
SRK006	Havana	TPD064	103.0	108.0	5.0	ANG	Waste	8.9	0.56
SRK019	Havana	TPD117	227.0	232.0	5.0	ANG	Waste	9.7	1.11
SRK027	Havana	TPD121	196.0	201.0	5.0	ANG	Waste	8.6	0.68
SRK038	Havana	TPD123	51.0	56.0	5.0	ANG	Waste	8.2	0.63
SRK071	Havana	TPD348	145.0	150.0	5.0	ANG	Waste	9.4	1.21
SRK009	Havana	TPD083	180.0	185.0	5.0	ANGA	Waste	9.2	0.74
SRK011	Havana	TPD084	215.0	220.0	5.0	ANGA	Waste	9.3	0.66
SRK015	Havana	TPD117	162.0	167.0	5.0	ANGA	Waste	9.2	0.44
SRK028	Havana	TPD121	204.0	209.0	5.0	ANGA	Waste	8.8	0.67
SRK030	Havana	TPD121	215.0	219.0	4.0	ANGA	Waste	8.8	0.88
SRK039	Havana	TPD126	150.0	155.0	5.0	ANGA	Waste	8.6	0.67
SRK040	Havana	TPD126	160.0	165.0	5.0	ANGA	Waste	9.2	0.54
SRK050	Havana	TPD132	131.0	136.0	5.0	ANGA	Waste	8.5	0.82
SRK060	Havana	TPD136	120.0	125.0	5.0	ANGA	Waste	8.8	1.14
SRK068	Havana	TPD338	39.0	44.0	5.0	ANGA	Waste	8.3	0.94
SRK069	Havana	TPD343	75.0	77.0	2.0	ANGA	Waste	8.1	1.08
SRK091	Havana	TPRC525	51.0	56.0	5.0	ANGA	Waste	8.5	1.26
SRK1B005	Tropicana	TPD238	117.0	122.0	5.0	ANGA	Waste	8.3	3.24
SRK1B045	Tropicana	TPD236	110.0	112.0	2.0	ANGA	Waste	7.5	5.66
SRK1B063	Havana	TPD041	151.0	160.0	9.0	ANGA	Waste	9	0.9

Table D-1: Paste pH and Conductivity Results (cont.)

Sample ID	Zone	Hole ID	From	To	Interval	Major Unit	Classification	Paste pH	Paste EC mS/cm
SRK1B065	Tropicana	TPD044	170.0	179.0	9.0	ANGA	Waste	9.1	0.67
SRK1B004	Tropicana	TPD246	118.0	123.0	5.0	ANGQ	Waste	8.5	1.39
SRK1B019	Tropicana	TPRC610	46.0	51.0	5.0	ANGQ	Waste	8.1	2.6
SRK1B064	Tropicana	TPD241	206.0	215.0	9.0	ANGQ	Waste	9.1	0.69
SRK1B013	Tropicana	TFRC077	77.0	79.0	2.0	APP	Waste	8	2.79
SRK1B038	Tropicana	TPRC180	125.0	127.0	2.0	APP	Waste	7.9	4.73
SRK1B046	Tropicana	TPRC078	95.0	97.0	2.0	APP	Waste	8.6	1.8
SRK088	Havana	TPRC353D	157.0	162.0	5.0	AX	Waste	8.1	2.61
SRK1B066	Havana	TPD312	291.0	294.2	3.2	AX	Waste	8.2	1.45
SRK1B011	Tropicana	TPRC076D	68.0	69.0	1.0	AZ	Waste	7.7	6.94
SRK1B025	Tropicana	TPRC545	154.0	156.0	2.0	AZ	Waste	8.5	2.31
SRK1B039	Tropicana	TPRC078D	67.0	69.0	2.0	AZ	Waste	7.7	5.86
SRK1B043	Havana	TPD043	85.0	89.0	4.0	AZ	Waste	9.2	0.78
SRK1B052	Tropicana	TPD044	128.0	131.0	3.0	AZ	Waste	7.7	3.33
SRK080	Havana	TPRC230D	143.0	148.0	5.0	AZB	Waste	9.1	1.72
SRK067	Tropicana	TPD233	192.0	195.0	3.0	AZC	Waste	9.2	1.82
SRK1B053	Tropicana	TPD045	95.0	97.0	2.0	AZC	Waste	7.5	10.02
SRK061	Havana	TPD154	167.0	172.0	5.0	AZS	Waste	8.7	1.6
SRK063	Havana	TPD195	2.0	7.0	5.0	MS	Waste	7.3	6.87
SRK087	Havana	TPRC332	6.0	11.0	5.0	MS	Waste	6.8	4.56
SRK062	Havana	TPD161	75.0	80.0	5.0	PPB	Waste	9.5	1.24
SRK016	Havana	TPD117	202.0	207.0	5.0	PPD	Waste	9.4	0.95
SRK043	Havana	TPD128	135.0	140.0	5.0	PPD	Waste	9.3	1.36
SRK044	Havana	TPD128	139.0	144.0	5.0	PPD	Waste	9.4	1.48
SRK093	Havana	TPRC637	0.0	2.0	2.0	QLSD	Waste	8	0.51

Table D-1: Paste pH and Conductivity Results (cont.)

Sample ID	Zone	Hole ID	From	To	Interval	Major Unit	Classification	Paste pH	Paste EC mS/cm
SRK094	Havana	TPRC639	0.0	3.0	3.0	QLSD	Waste	7.9	0.68
SRK013	Havana	TPD116	5.0	10.0	5.0	TL	Waste	6.7	3.99
SRK014	Havana	TPD117	10.0	15.0	5.0	TL	Waste	6.7	1.57
SRK024	Havana	TPD121	9.0	14.0	5.0	TL	Waste	5.2	4.57
SRK089	Havana	TPRC369	4.0	8.0	4.0	TL	Waste	7.6	7.02
SRK1B002	Tropicana	TFRC577	2.0	6.0	4.0	TL	Waste	7.9	3.65
SRK1B012	Tropicana	TPRC013	0.0	4.0	4.0	TL	Waste	7.1	1.54
SRK1B022	Havana	TPRC202	5.0	10.0	5.0	TL	Waste	7.7	14.16
SRK1B027	Tropicana	TFRC081	1.0	2.0	1.0	TL	Waste	7.2	3.03
SRK1B035	Tropicana	TPRC546	11.0	14.0	3.0	TL	Waste	7.4	4.11

Table D-2: Acid Base Account Test Results

Sample ID	Lithology	S	S-SO4	C	TIC	CarbNP	NP	MPA	NPR
		%	%	%	%				
SRK042	ALCY	0.089	0.1	0.09	< DL	0.82	0	3	0.0
SRK081	ALCY	0.057	0.07	0.03	< DL	0.82	16	2	9.2
SRK1B001	ALCY	0.075	0.04	0.09	( )	0.82	11	2	4.8
SRK1B001	ALCY	0.065	0.08	0.08	( )	0.82	8	2	4.0
SRK1B003	ALCY	0.044	0.04	0.03	( )	0.82	5	1	3.7
SRK1B036	ALCY	0.138	0.05	0.29	0.16	13	69	4	16.3
SRK1B042	ALCY	0.034	0.05	0.06	( )	0.82	9	1	8.7
SRK1B044	ALCY	0.381	0.25	0.05	( )	0.82	2	12	0.2
SRK037	AN	0.046	0.06	0.05	< DL	0.82	2	1	1.4
SRK086	AN	0.059	0.09	0.04	< DL	0.82	7	2	3.9
SRK066	ANA	0.247	0.12	0.89	0.78	64	143	8	18.9
SRK003	ANC RT	3.869	0.31	0.59	< DL	0.82	11	118	0.1
SRK004	ANC RT	4.06	0.4	0.52	< DL	0.82	9	124	0.1
SRK012	ANC RT	2.688	0.08	0.46	0.09	7.35	26	82	0.3
SRK025	ANC RT	0.851	0.01	0.22	0.23	19	17	26	0.7
SRK026	ANC RT	1.026	0.03	0.22	0.22	18	34	31	1.1
SRK029	ANC RT	1.73	0.1	0.17	0.17	14	47	53	0.9
SRK034	ANC RT	0.135	0.13	0.05	< DL	0.82	0	4	0.0
SRK074	ANC RT	3.781	0.27	0.84	< DL	0.82	24	116	0.2
SRK075	ANC RT	2.045	0.2	1.03	0.89	73	104	63	1.7
SRK082	ANC RT	0.415	0.02	0.22	0.13	11	16	13	1.3
SRK1B007	ANC RT	7.975	0.58	1.56	< DL	0.82	1	244	0.0
SRK1B029	ANC RT	14.32	0.94	0.68	< DL	0.82	-3	438	0.0
SRK1B061	ANC RT	5.89	0.39	0.37	0.12	9.8	78	180	0.4
SRK1B061	ANC RT	5.94	0.4	0.38	< DL	0.82	72	182	0.4
SRK1B062	ANC RT	1.762	0.21	0.6	< DL	0.82	53	54	1.0
SRK010	ANF	0.403	0.04	0.49	0.46	38	63	12	5.1
SRK046	ANF	0.084	0.02	0.23	0.24	20	73	3	28.4
SRK057	ANF	0.553	0.12	0.28	0.28	23	70	17	4.1
SRK058	ANF	0.598	0.05	0.25	0.26	21	67	18	3.7
SRK076	ANF	0.743	0.04	0.47	0.47	38	99	23	4.4
SRK077	ANF	1.794	0.08	0.29	0.31	25	56	55	1.0
SRK078	ANF	0.758	0.1	0.21	0.19	16	52	23	2.2
SRK079	ANF	0.681	0.07	0.71	0.27	22	49	21	2.4
SRK095	ANF	0.009	0.03	0.1	< DL	0.82	29	0	105.3
SRK005	ANFA	0.16	0.06	0.09	0.02	1.63	36	5	7.4
SRK017	ANFA	0.448	0.05	0.36	0.37	30	73	14	5.3
SRK020	ANFA	0.199	0.07	0.55	0.53	43	87	6	14.3
SRK031	ANFA	0.269	0.03	0.25	0.25	20	56	8	6.8
SRK045	ANFA	0.155	0.05	0.39	0.41	33	77	5	16.2
SRK052	ANFA	0.21	0.03	0.31	0.29	24	65	6	10.1
SRK059	ANFA	0.082	0.04	0.25	0.25	20	74	3	29.5
SRK092	ANFA	0.015	0.01	0.13	< DL	0.82	27	0	58.8
SRK018	ANFA-ANGA	0.271	0.06	0.22	0.22	18	63	8	7.6
SRK021	ANFF	0.843	0.04	0.4	0.41	33	67	26	2.6
SRK022	ANFF	0.82	0.04	0.44	0.41	33	67	25	2.7
SRK032	ANFF	0.404	0.05	0.34	0.35	29	66	12	5.3
SRK033	ANFF	1.174	0.05	0.32	0.34	28	62	36	1.7
SRK035	ANFF	1.127	0.07	0.35	0.35	29	66	34	1.9
SRK036	ANFF	0.604	0.04	0.36	0.36	29	65	18	3.5
SRK051	ANFF	1.706	0.11	0.3	0.3	24	65	52	1.2
SRK056	ANFF	1.149	0.05	0.24	0.23	19	56	35	1.6
SRK064	ANFF	0.081	0.03	0.41	0.41	33	89	2	35.9
SRK070	ANFF	1.332	0.05	0.2	0.19	16	60	41	1.5
SRK090	ANFF	0.034	0.03	0.06	< DL	0.82	51	1	49.0

Table D-2: Acid Base Account Test Results (cont.)

Sample ID	Lithology	S	S-SO4	C	TIC	CarbNP	NP	MPA	NPR
		%	%	%	%				
SRK096	ANFF	1.171	0.08	0.4	0.28	23	62	36	1.7
SRK1B006	ANFF	0.182	0.16	0.04	( )	0.82	8	6	1.4
SRK1B008	ANFF	0.176	0.02	0.14	< DL	0.82	43	5	8.0
SRK1B009	ANFF	2.385	0.09	0.12	< DL	0.82	26	73	0.4
SRK1B033	ANFF	1.18	0.09	0.12	< DL	0.82	43	36	1.2
SRK1B037	ANFF	0.611	0.08	0.15	< DL	0.82	21	19	1.1
SRK1B041	ANFF	1.748	0.11	0.13	< DL	0.82	48	53	0.9
SRK1B041	ANFF	1.79	0.1	0.14	( )	0.82	44	55	0.8
SRK1B051	ANFF	2.281	0.1	0.15	< DL	0.82	22	70	0.3
SRK023	ANFQ	0.24	0.05	0.29	0.24	20	57	7	7.8
SRK041	ANFQ	1.215	0.03	0.19	0.18	15	39	37	1.0
SRK049	ANFQ	0.601	0.08	0.28	0.28	23	61	18	3.3
SRK053	ANFQ	0.053	0.03	0.28	0.23	19	65	2	40.1
SRK054	ANFQ	1.321	0.11	0.2	0.22	18	50	40	1.2
SRK055	ANFQ	0.138	0.03	0.25	0.26	21	67	4	15.9
SRK083	ANFQ	0.891	0.08	0.27	0.28	23	64	27	2.3
SRK084	ANFQ	0.248	0.28	0.06	< DL	0.82	10	8	1.3
SRK085	ANFQ	0.274	0.06	0.59	0.57	47	66	8	7.9
SRK1B010	ANFQ	0.65	0.05	0.11	< DL	0.82	24	20	1.2
SRK1B015	ANFQ	0.742	0.1	0.17	< DL	0.82	34	23	1.5
SRK1B017	ANFQ	0.534	0.04	0.25	0.22	18	31	16	1.9
SRK1B018	ANFQ	0.102	0.03	0.27	0.28	23	35	3	11.2
SRK1B028	ANFQ	0.137	0.04	0.2	0.18	15	55	4	13.1
SRK1B030	ANFQ	0.817	0.06	1.58	0.92	75	115	25	4.6
SRK006	ANG	0.207	0.06	1.39	1.13	92	171	6	27.0
SRK019	ANG	0.319	0.06	0.27	0.27	22	65	10	6.7
SRK027	ANG	0.196	0.02	0.41	0.38	31	59	6	9.8
SRK038	ANG	0.11	< DL	0.38	0.34	28	41	3	12.2
SRK071	ANG	0.204	0.03	0.4	0.43	35	80	6	12.8
SRK009	ANGA	0.198	< DL	0.21	0.2	16	44	6	7.3
SRK011	ANGA	0.064	0.04	0.29	0.25	20	57	2	29.1
SRK015	ANGA	0.09	< DL	0.22	0.22	18	51	3	18.5
SRK028	ANGA	0.227	0.02	0.29	0.27	22	69	7	9.9
SRK030	ANGA	0.505	0.04	0.2	0.22	18	82	15	5.3
SRK039	ANGA	0.122	0.04	0.53	0.54	44	61	4	16.3
SRK040	ANGA	0.146	0.03	0.22	0.21	17	42	4	9.4
SRK050	ANGA	0.159	< DL	0.29	0.27	22	43	5	8.8
SRK060	ANGA	0.432	0.1	0.58	0.41	33	80	13	6.1
SRK068	ANGA	< DL	0.02	0.07	< DL	0.82	26	-	-
SRK069	ANGA	0.194	0.04	0.64	0.55	45	84	6	14.1
SRK091	ANGA	0.037	< DL	0.11	0.03	2.45	25	1	22.1
SRK1B005	ANGA	0.127	0.02	0.24	< DL	0.82	42	4	10.8
SRK1B045	ANGA	1.083	0.18	0.22	< DL	0.82	35	33	1.1
SRK1B063	ANGA	0.187	0.05	0.43	0.4	33	86	6	15.0
SRK1B065	ANGA	0.123	0.02	0.32	0.19	16	81	4	21.5
SRK1B004	ANGQ	0.216	0.04	0.47	0.36	29	55	7	8.3
SRK1B019	ANGQ	0.018	0.01	0.03	( )	0.82	16	1	29.0
SRK1B064	ANGQ	0.117	0.03	0.34	0.3	24	69	4	19.3
SRK1B013	APP	0.353	0.03	0.06	( )	0.82	13	11	1.2
SRK1B038	APP	0.833	0.11	0.24	0.11	8.98	50	25	2.0
SRK1B046	APP	0.167	0.03	0.22	< DL	0.82	45	5	8.8
SRK088	AX	1.414	0.06	0.43	0.27	22	55	43	1.3
SRK1B066	AX	4.98	0.1	0.29	0.25	20	65	152	0.4

Table D-2: Acid Base Account Test Results (cont.)

Sample ID	Lithology	S	S-SO4	C	TIC	CarbNP	NP	MPA	NPR
		%	%	%	%				
SRK1B011	AZ	0.687	0.08	0.17	< DL	0.82	51	21	2.4
SRK1B025	AZ	0.325	0.06	0.58	0.38	31	94	10	9.5
SRK1B039	AZ	1.584	0.15	0.28	< DL	0.82	56	48	1.2
SRK1B043	AZ	0.193	0.03	0.28	0.28	23	111	6	18.8
SRK1B052	AZ	0.378	0.06	1.32	1.23	100	176	12	15.2
SRK080	AZB	0.34	0.1	0.54	0.51	42	97	10	9.3
SRK067	AZC	0.683	0.05	0.42	0.35	29	87	21	4.2
SRK1B053	AZC	0.599	0.16	0.16	< DL	0.82	47	18	2.6
SRK061	AZS	0.697	0.11	0.55	0.49	40	109	21	5.1
SRK063	MS	0.136	0.17	0.1	0.02	1.63	2	4	0.5
SRK087	MS	0.036	0.05	0.08	< DL	0.82	10	1	9.1
SRK062	PPB	0.278	0.07	0.3	0.31	25	79	9	9.3
SRK016	PPD	0.313	0.07	0.59	0.56	46	123	10	12.8
SRK043	PPD	0.328	0.08	0.56	0.57	47	96	10	9.6
SRK044	PPD	0.307	0.07	0.59	0.58	47	122	9	13.0
SRK093	QLSD	0.013	< DL	0.21	0.07	5.71	14	0	35.2
SRK094	QLSD	0.006	< DL	0.15	0.01	0.82	4	0	21.8
SRK013	TL	0.027	0.03	0.59	< DL	0.82	0	1	0.0
SRK014	TL	0.011	0.02	0.06	< DL	0.82	0	0	0.0
SRK024	TL	0.036	0.04	0.14	< DL	0.82	0	1	0.0
SRK089	TL	0.168	0.18	0.23	0.17	14	25	5	4.9
SRK1B002	TL	0.105	0.05	0.63	0.48	39	50	3	15.6
SRK1B012	TL	0.074	0.04	0.09	( )	0.82	9	2	4.0
SRK1B022	TL	0.078	0.07	1.37	1.33	109	126	2	52.8
SRK1B027	TL	0.026	0.03	0.08	( )	0.82	9	1	11.3
SRK1B035	TL	0.058	0.05	0.23	< DL	0.82	31	2	17.5

Notes: S=sulphur; C=carbon; TIC=total inorganic carbon; ANC=acid neutralisation capacity; CarbNP=carbonate-based acid neutralising capacity, MPA=maximum potential acidity; AP=acid potential (based on estimated sulphide S content of samples (i.e. having accounted for the amount of S present as sulphate S, i.e. already oxidised); NAPP=net acid producing potential; NPR=net potential ratio), undefined=result of AP being equal to zero.

Summary of AMIRA (2002) type classification (further details given in report text):

NAF	Samples with negative NAPP, NAG pH>= 4.5
PAF-LC	Samples with positive NAPP, NAG pH < 4.5 but NAG acidity <5 (pH 4.5)
PAF	Samples with positive NAPP, NAG pH < 4.5 and high NAG acidities (pH 4.5)
UC(PAF)	Samples with negative NAPP but NAG pH < 4.5
UC(PAF, high TOC)	Samples with positive NAPP, NAG pH < 4.5 but high organic C
UC(NAF)	Samples with positive NAPP, NAG pH > 4.5

Summary of Price (1997) classification:

NAF	NPR > 3
UC	1< NPR <3
PAF	NPR < 1

Table D-3: Acid Buffering Capacity Curve (ABCC) Test Results

SRK029			SRK033			SRK037		
ANC	47		ANC	62		ANC	2	
Vol Acid		ANC	Vol Acid		ANC	Vol Acid		ANC
0.1 M	pH	Consumed	0.1M	pH	Consumed	0.1M	pH	Consumed
0.0	9.8	0.0	0.0	9.6	0.0	0.0	5.9	0.0
0.2	9.2	0.5	0.5	7.9	1.3	0.2	5.2	0.5
0.4	8.7	1.0	1.0	6.9	2.6	0.4	4.7	1.0
0.6	8.4	1.6	1.5	6.6	3.9	0.6	4.2	1.6
0.8	8.2	2.1	2.0	6.4	5.2	0.8	3.7	2.1
1.0	8.0	2.6	2.5	6.2	6.5	1.0	3.7	2.6
1.2	7.9	3.1	3.0	6.1	7.8	1.2	3.5	3.1
1.4	7.8	3.6	3.5	6.0	9.1	1.4	3.3	3.6
1.6	7.7	4.2	4.0	5.8	10.4	1.6	3.1	4.2
1.8	7.5	4.7	4.5	5.7	11.7	1.8	3.0	4.7
2.0	7.4	5.2	5.0	5.5	13.0	2.0	2.9	5.2
2.2	7.4	5.7	5.5	5.3	14.3	2.2	2.8	5.7
2.4	7.5	6.2	6.0	5.1	15.6	2.4	2.7	6.2
2.6	7.3	6.8	6.5	4.9	16.9	2.6	2.7	6.8
2.8	7.2	7.3	7.0	4.8	18.2	2.8	2.7	7.3
3.0	7.1	7.8	7.5	4.5	19.5	3.0	2.6	7.8
3.2	6.9	8.3	8.0	4.3	20.8	3.2	2.5	8.3
3.4	6.8	8.8	8.5	4.1	22.1	3.4	2.5	8.8
3.6	6.6	9.3	9.0	3.9	23.4			
3.8	6.7	9.9	9.5	3.6	24.7			
4.0	6.1	10.4	10.0	3.4	26.0			
4.2	5.5	10.9	10.5	3.3	27.3			
4.4	5.0	11.4	11.0	3.1	28.6			
4.6	4.7	11.9	11.5	3.0	29.9			
4.8	4.5	12.5	12.0	2.8	31.2			
5.0	4.7	13.0	12.5	2.6	32.5			
5.2	4.3	13.5	13.0	2.6	33.8			
5.4	4.1	14.0	14.0	2.4	36.4			
5.6	4.0	14.5						
5.8	3.9	15.1						
6.0	3.8	15.6						
6.2	3.7	16.1						
6.4	3.5	16.6						
6.8	3.8	17.7						
7.2	3.5	18.7						
7.6	3.3	19.7						
8.0	3.2	20.8						
8.4	3.0	21.8						
8.8	2.9	22.9						
9.2	2.8	23.9						
9.6	2.7	24.9						
10.0	2.6	26.0						
10.4	2.5	27.0						
10.8	2.4	28.0						

Note: ANC in units of kgH_2SO_4/tonne

Table D-3: Acid Buffering Capacity Curve (ABCC) Test Results (cont.)

SRK045			SRK074			SRK075		
ANC	77		ANC	24		ANC	106	
Vol Acid		ANC	Vol Acid		ANC	Vol Acid		ANC
0.1M	pH	Consumed	0.1M	pH	Consumed	0.1M	pH	Consumed
0.0	9.9	0.0	0.0	5.6	0.0	0.0	9.6	0.0
0.5	8.8	1.3	0.2	5.1	0.5	1.0	7.8	2.6
1.0	8.1	2.6	0.4	4.8	1.0	2.0	6.8	5.2
1.5	7.8	3.9	0.6	4.5	1.6	3.0	6.6	7.8
2.0	7.7	5.2	0.8	4.4	2.1	4.0	6.4	10.4
2.5	7.6	6.5	1.0	4.1	2.6	5.0	6.4	13.0
3.0	7.5	7.8	1.2	4.0	3.1	6.0	6.2	15.6
3.5	7.5	9.1	1.4	3.8	3.6	7.0	6.2	18.2
4.0	7.5	10.4	1.6	3.7	4.2	8.0	6.1	20.8
4.5	7.5	11.7	1.8	3.6	4.7	9.0	6.0	23.4
5.0	7.5	13.0	2.0	3.5	5.2	10.0	5.9	26.0
5.5	7.4	14.3	2.2	3.4	5.7	11.0	5.8	28.6
6.0	7.3	15.6	2.4	3.2	6.2	12.0	5.7	31.2
6.5	7.1	16.9	2.6	3.2	6.8	13.0	5.5	33.8
7.0	7.0	18.2	2.8	3.2	7.3	14.0	5.4	36.4
7.5	7.1	19.5	3.0	3.2	7.8	15.0	5.4	39.0
8.0	6.8	20.8	3.2	3.1	8.3	16.0	5.1	41.6
8.5	6.7	22.1	3.4	3.0	8.8	17.0	5.0	44.1
9.0	6.5	23.4	3.6	3.0	9.3	18.0	4.8	46.7
9.5	6.2	24.7	3.8	2.9	9.9	19.0	4.6	49.3
10.0	5.8	26.0	4.0	2.9	10.4	20.0	4.1	51.9
10.5	5.5	27.3	4.2	2.8	10.9	21.0	4.0	54.5
11.0	4.7	28.6	4.4	2.8	11.4	22.0	3.8	57.1
11.5	4.2	29.9	4.6	2.7	11.9	23.0	3.7	59.7
12.0	4.0	31.2	4.8	2.7	12.5	24.0	3.3	62.3
12.5	3.8	32.5	5.0	2.7	13.0	25.0	3.1	64.9
13.0	3.4	33.8	5.2	2.6	13.5	26.0	2.9	67.5
13.5	3.4	35.1	5.4	2.6	14.0	27.0	2.8	70.1
14.0	3.2	36.4	5.6	2.6	14.5	28.0	2.8	72.7
14.5	3.0	37.7	5.8	2.5	15.1	29.0	2.7	75.3
15.0	2.9	39.0	6.0	2.5	15.6	30.0	2.6	77.9
15.5	2.8	40.3	6.2	2.5	16.1	31.0	2.5	80.5
16.0	2.7	41.6						
16.5	2.6	42.9						
17.0	2.5	44.1						

Note: ANC in units of kgH_2SO_4/tonne

Table D-3: Acid Buffering Capacity Curve (ABCC) Test Results (cont.)

SRK077			SRK088		
ANC	56		ANC	57	
Vol Acid 0.1M	pH	ANC Consumed	Vol Acid 0.1M	pH	ANC Consumed
0.0	9.0	0.0	0.0	9.6	0.0
0.5	8.6	1.3	0.5	9.0	1.3
1.0	8.0	2.6	1.0	8.6	2.6
1.5	7.7	3.9	1.5	7.9	3.9
2.0	7.7	5.2	2.0	7.2	5.2
2.5	7.5	6.5	2.5	6.9	6.5
3.0	7.4	7.8	3.0	6.7	7.8
3.5	7.2	9.1	3.5	6.6	9.1
4.0	7.2	10.4	4.0	6.5	10.4
4.5	7.0	11.7	4.5	6.4	11.7
5.0	6.9	13.0	5.0	6.3	13.0
5.5	6.7	14.3	5.5	6.1	14.3
6.0	6.5	15.6	6.0	5.9	15.6
6.5	6.3	16.9	6.5	5.7	16.9
7.0	6.0	18.2	7.0	5.6	18.2
7.5	5.6	19.5	7.5	5.5	19.5
8.0	4.8	20.8	8.0	5.0	20.8
8.5	4.3	22.1	8.5	4.9	22.1
9.0	4.0	23.4	9.0	4.9	23.4
9.5	3.6	24.7	9.5	4.4	24.7
10.0	3.3	26.0	10.0	4.3	26.0
10.5	3.1	27.3	10.5	3.9	27.3
11.0	3.0	28.6	11.0	3.7	28.6
11.5	2.9	29.9	11.5	3.5	29.9
12.0	2.8	31.2	12.0	3.3	31.2
12.5	2.7	32.5	12.5	3.2	32.5
13.0	2.7	33.8	13.0	3.2	33.8
13.5	2.6	35.1	13.5	3.0	35.1
14.0	2.5	36.4	14.0	2.9	36.4
			14.5	2.8	37.7
			15.0	2.8	39.0
			15.5	2.7	40.3
			16.0	2.6	41.6
			16.5	2.6	42.9
			17.0	2.5	44.1

Note: ANC in units of kgH_2SO_4/tonne

Table D-4: Net Acid Generation (NAG) Test Results

Sample ID	Lithology	NAG(4.5)	NAG	NAGpH	NAGpHfn	NAGeC	AP
		4/kgH2SO4/	kgH2SO4/				kgH2SO4
SRK042	ALCY	0	2	4.4	4.3		0
SRK081	ALCY	0	0	6.9	7.3		0
SRK1B001	ALCY	0	0	7.2		0.11	1
SRK1B001	ALCY	0	0	8.3		0.12	0
SRK1B003	ALCY	0	1	5.1		0.11	0
SRK1B036	ALCY	0	0	8.4		0.15	3
SRK1B042	ALCY	0	0	7.7		0.08	0
SRK1B044	ALCY	0	3	4.9		0.19	4
SRK037	AN	0	2	5.4	5.8		0
SRK086	AN	0	0	6.4	7.4		0
SRK066	ANA	0	0	8	9.5		4
SRK003	ANC RT	83	94	2.4	2.4		109
SRK004	ANC RT	85	101	2.4	2.3		112
SRK012	ANC RT	47	58	2.6	2.5		80
SRK025	ANC RT	1	5	3.2	3.6		26
SRK026	ANC RT	1	5	3.6	4		30
SRK029	ANC RT	10	19	3	3.1		50
SRK034	ANC RT	0	3	4.1	4.3		0
SRK074	ANC RT	54	89	2.4	2.6		107
SRK075	ANC RT	0	0	7.1	7.8		56
SRK082	ANC RT	0	0	6.2	7		12
SRK1B007	ANC RT	162	176	2.2		2.6	226
SRK1B029	ANC RT	237	296	2.1		3.03	409
SRK1B061	ANC RT	95	125	2.3		1.77	168
SRK1B061	ANC RT	94	118	2.4		1.58	170
SRK1B062	ANC RT	8	27	3.2		1.07	47
SRK010	ANF	0	0	7.7	10.6		11
SRK046	ANF	0	0	7.6	9.9		2
SRK057	ANF	0	0	7.5	9.1		13
SRK058	ANF	0	0	7.4	9.3		17
SRK076	ANF	0	0	8.7	9		22
SRK077	ANF	0	0	7.7	8.7		52
SRK078	ANF	0	1	4.6	4.7		20
SRK079	ANF	0	0	7.5	9		19
SRK095	ANF	0	0	6.4	7.7		0
SRK005	ANFA	0	0	6.4	7		3
SRK017	ANFA	0	0	7.5	10.3		12
SRK020	ANFA	0	0	7.5	10.7		4
SRK031	ANFA	0	0	7.6	8.6		7
SRK045	ANFA	0	0	7.6	10		3
SRK052	ANFA	0	0	7.5	9.5		6
SRK059	ANFA	0	0	7.4	9.2		1
SRK092	ANFA	0	0	6.2	7.4		0
SRK018	ANFA-ANGA	0	0	7.5	10.3		6
SRK021	ANFF	0	0	7.5	10.4		25
SRK022	ANFF	0	0	7.8	8.4		24
SRK032	ANFF	0	0	7.5	8.5		11
SRK033	ANFF	0	0	6.9	7.7		34
SRK035	ANFF	0	0	7.6	8.5		32
SRK036	ANFF	0	0	7.5	8.5		17
SRK051	ANFF	0	0	9.4	8.3		49
SRK056	ANFF	0	0	7.4	8.7		34

Table D-4: Net Acid Generation (NAG) Test Results (cont.)

Sample ID	Lithology	NAG(4.5)	NAG	NAGpH	NAGpHfn	NAGeC	AP
		4/kgH2SO4/	kgH2SO4/				kgH2SO4
SRK064	ANFF	0	0	7.8	9.6		2
SRK070	ANFF	0	0	7.4	6.1		39
SRK090	ANFF	0	0	6.5	8.2		0
SRK096	ANFF	0	0	7.3	10.2		33
SRK1B006	ANFF	0	0	7.4		0.09	1
SRK1B008	ANFF	0	0	8.4		0.1	5
SRK1B009	ANFF	37	45	2.5		1.23	70
SRK1B033	ANFF	10	17	2.8		1.01	33
SRK1B037	ANFF	2	4	3.6		0.44	16
SRK1B041	ANFF	16	27	2.7		1.26	50
SRK1B041	ANFF	17	27	2.6		1.38	52
SRK1B051	ANFF	37	47	2.4		1.71	67
SRK023	ANFQ	0	0	7.5	8.4		6
SRK041	ANFQ	8	12	7	2.8		36
SRK049	ANFQ	0	0	7.6	9.1		16
SRK053	ANFQ	0	0	7.4	9.7		1
SRK054	ANFQ	5	8	7.1	3		37
SRK055	ANFQ	0	0	7.5	9.4		3
SRK083	ANFQ	0	0	7.5	9.4		25
SRK084	ANFQ	0	0	6.2	6.3		0
SRK085	ANFQ	0	0	7.6	11		7
SRK1B010	ANFQ	6	8	3		0.67	18
SRK1B015	ANFQ	5	9	3.3		0.45	20
SRK1B017	ANFQ	0	0	9.3		0.27	15
SRK1B018	ANFQ	0	0	9.5		0.22	2
SRK1B028	ANFQ	0	0	8.8		0.19	3
SRK1B030	ANFQ	0	0	8.7		0.17	23
SRK006	ANG	0	0	8.3	9.1		4
SRK019	ANG	0	0	7.5	10.6		8
SRK027	ANG	0	0	7.6	8.3		5
SRK038	ANG	0	0	7.3	8.2		3
SRK071	ANG	0	0	7.9	9.3		5
SRK009	ANGA	0	0	7.3	10		6
SRK011	ANGA	0	0	7.6	10.9		1
SRK015	ANGA	0	0	7.5	10.3		3
SRK028	ANGA	0	0	7.5	8.4		6
SRK030	ANGA	0	0	7.6	8		14
SRK039	ANGA	0	0	7.5	8.4		3
SRK040	ANGA	0	0	7.3	8.2		4
SRK050	ANGA	0	0	7.5	10.3		5
SRK060	ANGA	0	0	7.8	8.9		10
SRK068	ANGA	0	0	6.4	8.2		0
SRK069	ANGA	0	0	7.8	9.3		5
SRK091	ANGA	0	0	6.5	8		1
SRK1B005	ANGA	0	0	9.6		0.15	3
SRK1B045	ANGA	5	10	3.2		0.67	28
SRK1B063	ANGA	0	0	8.4		0.17	4
SRK1B065	ANGA	0	0	8.4		0.14	3
SRK1B004	ANGQ	0	0	9.8		0.18	5
SRK1B019	ANGQ	0	0	8.3		0.06	0
SRK1B064	ANGQ	0	0	8.5		0.12	3
SRK1B013	APP	2	4	3.4		0.31	10
SRK1B038	APP	0	0	7.2		0.41	22
SRK1B046	APP	0	0	8.4		0.14	4
SRK088	AX	6	10	3.7	3		41
SRK1B066	AX	70	85	2.5		1.19	149

Table D-4: Net Acid Generation (NAG) Test Results (cont.)

Sample ID	Lithology	NAG(4.5)	NAG	NAGpH	NAGpHfn	NAGeC	AP
		4/kgH2SO4/	kgH2SO4/				kgH2SO4
SRK1B011	AZ	1	5	3.6		0.46	19
SRK1B025	AZ	0	0	9.3		0.25	8
SRK1B039	AZ	11	16	2.7		1.28	44
SRK1B043	AZ	0	0	8.3		0.12	5
SRK1B052	AZ	0	0	9		0.15	10
SRK080	AZB	0	0	8.3	9.2		7
SRK067	AZC	0	0	7.5	9		19
SRK1B053	AZC	0	1	4.6		0.39	13
SRK061	AZS	0	0	7.3	8.8		18
SRK063	MS	0	2	5.6	5.8		0
SRK087	MS	0	3	5.3	5.7		0
SRK062	PPB	0	0	8	9.4		6
SRK016	PPD	0	0	7.6	10.2		7
SRK043	PPD	0	0	7.8	9.6		8
SRK044	PPD	0	0	7.9	9.9		7
SRK093	QLSD	0	1	6.6	6.8		0
SRK094	QLSD	0	0	6.1	7.2		0
SRK013	TL	0	5	5.1	4.7		0
SRK014	TL	0	5	5.5	5.7		0
SRK024	TL	0	2	4.8	4.9		0
SRK089	TL	0	0	6.9	7.9		0
SRK1B002	TL	0	0	9		0.28	2
SRK1B012	TL	0	0	6.7		0.06	1
SRK1B022	TL	0	0	9.4		0.26	0
SRK1B027	TL	0	0	6.9		0.07	0
SRK1B035	TL	0	0	8.4		0.25	0

Table D-5: Sequential Net Acid Generation (NAG) Test Results

			NAPP	CarbNAPP	NAGpHin	S	NAG(4.5)	NAG pH	NAG	Cumulative NAG	NAPP Consumed	CarbNAPP Consumed
Stage	Sample	Lithology	kgH2SO4/t	kgH2SO4/t	NONE	%	kgH2SO4/t		kgH2SO4/t	kgH2SO4/t	(%)	(%)
1	SRK025	ANC RT	9	7	4	1	1	3.3	2.4	2.4	27.5	32.7
2	SRK025r1				( )	0.07	0	4.6	1	3.4	38.9	46.4
3	SRK025r2				( )	0.03	0	5.9	0.3	3.7	42.4	50.4
1	SRK033	ANFF	-28	7	7	1	2	3.5	2.6	2.6	n/a	36.1
2	SRK033r1				( )	0.03	0	5.6	0.3	2.9	n/a	40.3
3	SRK033r2				( )	X	0	6.2	0.1	3.0	n/a	41.7
1	SRK041	ANFQ	-3	22	7	1	11	2.7	13.6	13.6	n/a	62.2
2	SRK041r1				( )	0.1	0.1	4.2	0.7	14.3	n/a	65.4
3	SRK041r2				( )	0	0	5.7	0.3	14.6	n/a	66.8
1	SRK054	ANFQ	-13	19	8	0	0	9.7	0	0.0	n/a	0.0
2	SRK054r1				( )	0.55	1.6	3.1	2.6	2.6	n/a	13.4
3	SRK054r2				( )	0.04	0	6.3	0.3	2.9	n/a	14.9
1	SRK074	ANC RT	83	107	2	3	37	2.3	51	51.0	61.1	47.8
2	SRK074r1				2.6	0.78	9.4	2.8	11.8	62.8	75.3	58.9
3	SRK074r2				2.5	0.06	13.1	2.5	14.9	77.7	93.1	72.9
4	SRK074r3				( )	0.03	0.3	3.8	0.7	78.4	94.0	73.5
5	SRK074r4				( )	0.02	0	4.8	0.5	78.9	94.6	74.0
1	SRK075	ANC RT	-48	-15	7	1	0	7.2	0	0.0	0.0	0.0
2	SRK075r1				( )	0.31	0	8.1	0	0.0	0.0	0.0
1	SRK077	ANF	-4	28	7	0	0	10	0	0.0	0.0	0.0
2	SRK077r1				( )	1.45	13.6	2.6	16.7	16.7	n/a	60.4
3	SRK077r2				( )	0.11	0.3	4.1	1	17.7	n/a	64.0
4	SRK077r3				( )	0.02	0	5.4	0.3	18.0	n/a	65.1

Table D-5: Sequential Net Acid Generation (NAG) Test Results (cont.)

			NAPP	CarbNAPP	NAGpHin	S	NAG(4.5)	NAG pH	NAG	Cumulative NAG	NAPP Consumed	CarbNAPP Consumed
Stage	Sample	Lithololgy	kgH2SO4/t	kgH2SO4/t	NONE	%	kgH2SO4/t		kgH2SO4/t	kgH2SO4/t	(%)	(%)
1	SRK078	ANF	-32	5	4	1	1	3.3	2.6	2.6	n/a	52.7
2	SRK078r1				( )	0.02	0	5.8	0.5	3.1	n/a	62.8
3	SRK078r2				( )	X	0	5.8	0.5	3.6	n/a	73.0
1	SRK088	AX	-14	20	3	1	7	3.3	11	11.0	n/a	55.5
2	SRK088r1				( )	0.08	0.3	4	0.8	11.8	n/a	59.5
3	SRK088r2				( )	0.03	0	4.8	0.5	12.3	n/a	62.0
1	SRK096	ANFF	-29	11	8	0	0	9.8	0	0.0	n/a	0.0
2	SRK096r1				( )	0.22	0	6.8	0.3	0.3	n/a	2.7
3	SRK096r2				( )	0.01	0	7.4	0	0.3	n/a	2.7

Table D-6: Kinetic Net Acid Generation (NAG) Test Results

Time (min.)	SRK006		SRK025		SRK042		SRK074		SRK075		SRK077	
	pH	Temp (oC)	pH	Temp (oC)	pH	Temp (oC)	pH	Temp (oC)	pH	Temp (oC)	pH	Temp (oC)
0	5.0	22	4.9	21	5.0	20	4.9	22	4.9	21	5.0	22
5	6.8	22.5	-	21	4.1	21	2.6	23	-	-	6.5	22
10	-	-	-	21	-	-	2.2	23	-	-	-	-
15	7.1	23	6.5	21	4.1	21	2.2	24	6.3	21	6.9	22
20	-	-	-	21	-	-	2.0	25	-	-	-	-
25	-	-	-	21	-	-	1.8	27	-	-	-	-
30	7.0	23	6.7	21	4.2	21	1.6	30	6.6	21	6.9	22
33	-	-	-	21	-	-	2.0	35	-	-	-	-
36	-	-	-	21	-	-	2.0	38	-	-	-	-
38	-	-	-	21	-	-	2.0	42	-	-	-	-
40	-	-	-	21	-	-	2.0	48	-	-	-	-
42	-	-	-	-	-	-	2.0	59	-	-	-	-
44	-	-	-	-	-	-	1.9	73	-	-	-	-
45	-	-	6.7	21	4.1	21	-	-	6.6	21	6.9	22
46	-	-	-	-	-	-	1.8	74	-	-	-	-
48	-	-	-	-	-	-	1.8	68	-	-	-	-
58	-	-	-	-	-	-	1.8	47	-	-	-	-
60	7.0	23	6.6	22	4.1	21	-	-	6.6	22	6.9	22
70	-	-	-	-	-	-	1.8	38	-	-	-	-
75	-	-	6.6	22	-	-	-	-	6.6	22	6.9	22
80	-	-	-	-	-	-	1.8	30	-	-	-	-
90	7.0	23	6.6	22	4.1	21	-	-	6.5	23	6.9	22
105	-	-	6.6	22	-	-	-	-	6.4	23	6.9	22
120	7.1	23	6.6	22	4.1	21	2.0	24	6.4	23	7.0	22
135	-	-	6.6	22	-	-	2.1	23	-	-	7.0	22
150	7.0	23	6.6	23	4.1	21	2.0	23	6.4	-	7.0	22
165	-	-	6.6	23	-	-	-	-	-	-	7.0	22
180	7.1	23	6.5	23	4.1	21	2.0	22	6.3	23	7.0	22
195	-	-	-	-	-	-	-	-	-	-	7.0	22
210	-	-	6.4	23	4.2	21	-	-	6.2	24	7.0	22
225	-	-	-	-	-	-	-	-	-	-	7.0	22
240	-	-	6.3	23	4.1	21	2.0	22	6.2	25	7.0	22
255	-	-	-	-	-	-	-	-	-	-	7.0	22
270	-	-	5.9	24	4.1	21	-	-	6.2	25	7.0	22
285	-	-	-	-	-	-	-	-	-	-	7.0	22
300	-	-	5.5	24	4.1	21	-	-	6.3	25	7.0	22
315	-	-	-	-	-	-	-	-	-	-	7.0	22
330	-	-	5.2	24	4.1	21	-	-	6.3	25	7.0	22
345	-	-	4.9	24	-	-	-	-	-	-	7.1	22.5
360	-	-	4.5	25	4.1	21	-	-	6.4	25	7.2	23
375	-	-	4.3	25	-	-	-	-	-	-	7.4	23
390	-	-	4.0	25	4.2	21	-	-	6.5	25	-	-
405	-	-	-	-	-	-	-	-	-	-	-	-
420	-	-	3.8	25	4.2	21	-	-	6.6	25	-	-
435	-	-	-	-	-	-	-	-	-	-	-	-
450	-	-	3.7	25	-	-	-	-	6.8	25	-	-
465	-	-	-	-	-	-	-	-	-	-	-	-
480	-	-	3.6	25	-	-	-	-	6.8	25	-	-

Table D-6: Kinetic Net Acid Generation (NAG) Test Results (cont.)

	SRK078		SRK088		SRK096	
Time (min.)	pH	Temp (oC)	pH	Temp (oC)	pH	Temp (oC)
0	5.2	22	5.2	22	5.0	22
5	6.6	22	6.6	22	6.8	22.5
10	-	-	-	-	-	-
15	6.7	22	6.7	23	7.1	23
20	-	-	-	-	-	-
25	-	-	-	-	-	-
30	6.7	22	6.5	23	7.0	23
33	-	-	-	-	-	-
36	-	-	-	-	-	-
38	-	-	-	-	-	-
40	-	-	-	-	-	-
42	-	-	-	-	-	-
44	-	-	-	-	-	-
45	6.6	23	6.5	23	-	-
46	-	-	-	-	-	-
48	-	-	-	-	-	-
58	-	-	-	-	-	-
60	6.6	23	6.6	23	7.0	23
70	-	-	-	-	-	-
75	-	-	-	-	-	-
80	-	-	-	-	-	-
90	6.6	23	6.0	24	7.0	23
105	-	-	-	-	-	-
120	6.6	23	5.5	25	7.1	23
135	-	-	-	-	-	-
150	6.7	23	4.8	25	7.0	23
165	-	-	-	-	-	-
180	6.6	23	4.6	25	7.1	23
195	-	-	-	-	-	-
210	6.7	23	4.4	25	-	-
225	-	-	-	-	-	-
240	6.6	23	4.2	25	-	-
255	-	-	-	-	-	-
270	6.6	23	-	-	-	-
285	-	-	-	-	-	-
300	6.5	23	4.0	25.5	-	-
315	-	-	-	-	-	-
330	6.2	23	3.9	25	-	-
345	-	-	-	-	-	-
360	6.1	24	3.7	25	-	-
375	-	-	-	-	-	-
390	5.9	23	-	-	-	-
405	-	-	-	-	-	-
420	5.8	23	3.6	25	-	-
435	-	-	-	-	-	-
450	-	-	-	-	-	-
465	-	-	-	-	-	-
480	-	-	-	-	-	-
1440	4.6	24	3.3	25	-	-

Table D-7: Elemental Analysis

Sample	Lithology	Au ppm	Ag ppm	Al ppm	As ppm	B ppm	Ba ppm	Be ppm	Bi ppm	Ca ppm	Cd ppm	Co ppm	Cr ppm	Cu ppm	F ppm	Fe %
SRK042	ALCY	< DL	0.2	11456	3.4	132	251.8	0.5	0.01	441	< DL	8.1	457	117	270	12.28
SRK081	ALCY	0.08	1.3	89549	1.6	< DL	1450.6	1.5	0.07	891	< DL	26.6	21	32	663	1.66
SRK1B001	ALCY	0.1	0.3	86884	15.5	< DL	799.4	0.9	0.11	1284	0.1	43.1	161	73	874	5.38
SRK1B001	ALCY	0.11	0.3	89124	14.9	< DL	852.4	0.7	0.08	1359	0.2	42.8	110	74	833	5.61
SRK1B003	ALCY	0.15	0.4	96599*	15.2	< DL	3816.4*	1.5	0.55	387	< DL	2.1	36	26	513	2.3
SRK1B036	ALCY	< DL	0.2	79308	2.9	< DL	110.9	0.2	0.02	72410	0.1	57.4	286*	111	554	9.92
SRK1B042	ALCY	0.01	0.2	91587*	3.5	< DL	269.4	0.8	0.04	19598	0.8	68	259	139	647	11.99
SRK1B044	ALCY	0.03	0.3	91515	10.4	72	1995.2	1.3	0.94	477	< DL	1.4	44	39	1168	3.28
SRK037	AN	< DL	0.3	84711	3.4	122	750.3	0.5	0.02	1185	< DL	15.1	88	84	426	8.73
SRK086	AN	0.01	0.4	89744	30.7	< DL	2059.2	1.5	0.12	1214	0.1	17.8	170	55	1131	4.29
SRK066	ANA	< DL	0.3	74424	1.4	67	266.7	0.4	0.02	29407	< DL	56.8	261	123	1110	8.23
SRK003	ANC RT	0.04	0.7	15565	75.1	< DL	43.9	0.6	0.1	4014	0.4	19.8	11	144	309	8.88
SRK004	ANC RT	0.05	0.8	15102	62.5	< DL	45.5	0.5	0.34	4447	0.4	20.8	10	155	311	9.41
SRK012	ANC RT	0.02	1.1	32154	128.4	91	138	0.5	0.41	8653	6.3	37.3	77	159	288	10.71
SRK025	ANC RT	0.08	0.3	6598	335.8	< DL	7.7	0.4	0.02	21268	0.2	10.7	34	210	353	18.78
SRK026	ANC RT	0.11	0.4	39317	62.7	< DL	65.1	0.4	0.04	48250	0.3	43.7	203	162	369	11.8
SRK029	ANC RT	0.02	0.8	69011	4.5	112	669.7	0.8	0.12	37789	5.7	27.4	170	146	538	6.22
SRK034	ANC RT	< DL	0.3	79743	63	80	541.2	0.5	0.09	301	0.1	11.4	815	212	295	11.56
SRK074	ANC RT	0.05	0.6	9748	35.1	< DL	22.1	0.3	0.13	5921	1.1	19.2	6	140	395	15.86
SRK075	ANC RT	0.01	0.9	59584	3.9	< DL	555.5	0.8	0.17	18727	0.5	28.2	194	89	914	7.51
SRK082	ANC RT	< DL	0.3	8509	4.2	< DL	6	0.4	0.03	14853	0.1	9.9	92	74	273	17.33
SRK1B007	ANC RT	< DL	0.6	54155	29.4	77	127.5	0.6	0.21	2331	0.4	26.4	57	266	1230	8.84
SRK1B029	ANC RT	0.04	1	23209	51	63	89.6	0.3	0.34	2765	0.3	62.8	76	487	877	17.55
SRK1B061	ANC RT	0.12	1	42262	7.9	< DL	178	0.7	0.25	19037	1.7	49.5	260	274	888	13.06
SRK1B061	ANC RT	0.11	0.9	43969	7.9	< DL	185.3	0.8	0.24	19951	1.4	52.4	282	266	882	13.09
SRK1B062	ANC RT	0.38	0.7	59005	16.2	< DL	591	1.1	0.12	15993	2.5	25	109	100	801	10.44
SRK010	ANF	0.01	0.3	69109	0.8	< DL	1109.6	1.1	0.01	25601	< DL	13.4	52	19	795	2.67
SRK046	ANF	< DL	0.3	74631	1.1	57	1289.9	1.1	0.04	26299	< DL	10.9	60	10	528	3.26
SRK057	ANF	0.34	0.8	65334	1.6	63	1706.3	0.8	0.01	18653	0.2	19.4	64	40	863	3.7
SRK058	ANF	0.17	0.4	70761	0.8	68	1869.2	1	< DL	19304	< DL	17.4	60	27	970	3.23
SRK076	ANF	0.01	2.8	69294	2.9	121	1487.7	1.2	0.03	21544	4.8	25.2	56	60	905	4.01
SRK077	ANF	0.26	0.5	81994	3.8	< DL	1076.7	2.5	0.49	25915	0.2	19	43	56	2522	4.27
SRK078	ANF	0.02	0.3	75785	0.9	< DL	1356.3	1.4	0.01	32786	0.1	23.6	107	30	1537	4.32
SRK079	ANF	0.02	0.5	71721	1.6	< DL	1254.4	0.9	0.03	20919	0.3	12.6	46	23	917	2.86

Table D-7: Elemental Analysis (cont.)

Sample	Lithology	Au ppm	Ag ppm	Al ppm	As ppm	B ppm	Ba ppm	Be ppm	Bi ppm	Ca ppm	Cd ppm	Co ppm	Cr ppm	Cu ppm	F ppm	Fe %
SRK095	ANF	0.03	0.6	76766	9.1	51	823	0.9	0.09	2786	0.2	24.3	97	62	613	4.86
SRK005	ANFA	0.01	0.3	71871	0.9	58	1266.7	1.1	0.03	15758	< DL	15.2	50	26	1082	3.13
SRK017	ANFA	0.02	0.4	65835	0.7	52	1566.6	1.6	0.01	23402	0.1	16.3	57	29	705	3.82
SRK020	ANFA	< DL	0.3	67043	0.9	67	1470.3	1.2	0.01	17594	< DL	16.6	63	26	873	3.63
SRK031	ANFA	0.01	0.4	73227	0.7	< DL	1566.4	1.3	0.01	28073	0.1	16.1	57	41	769	3.69
SRK045	ANFA	< DL	0.4	72377	0.7	< DL	1945	1.2	0.02	24807	< DL	11.5	34	8	801	2.75
SRK052	ANFA	0.01	0.3	70920	0.7	< DL	1356.1	1	0.01	24789	< DL	17.6	64	51	668	4.08
SRK059	ANFA	< DL	0.3	65219	0.6	58	1899.1	1	< DL	22706	< DL	12.4	38	9	491	2.81
SRK092	ANFA	0.01	0.4	79048	1.2	< DL	1271.7	1.3	0.08	11362	< DL	17.7	56	28	891	2.58
SRK018	ANFA-ANGA	0.01	0.4	74876	0.9	66	742.2	1.2	< DL	27645	< DL	25.7	102	55	780	5.18
SRK021	ANFF	0.32	0.5	73770	1.3	60	1892.6	1.4	0.02	17248	< DL	17.6	43	61	1267	3.51
SRK022	ANFF	0.08	0.5	68751	1.9	< DL	1448.1	1.6	0.65	21506	< DL	18	52	520	1114	3.21
SRK032	ANFF	0.01	0.4	65209	1.3	< DL	1625.8	1.3	0.03	18828	< DL	18.7	62	43	1072	3.58
SRK033	ANFF	0.03	0.5	70994	2.4	92	1747.2	0.8	0.09	8193	0.8	16.8	47	80	1597	2.92
SRK035	ANFF	0.77	0.7	72426	1.7	104	1693.6	0.9	0.05	15604	< DL	20.6	65	44	1062	3.99
SRK036	ANFF	0.07	0.6	70858	2	65	1390	1.3	0.06	20394	< DL	14.7	61	25	882	2.83
SRK051	ANFF	0.3	1.5	70845	3.4	< DL	1080.3	0.7	0.14	17114	1.3	15.8	38	43	1054	3.25
SRK056	ANFF	0.1	0.4	70166	0.8	< DL	1926.3	0.7	0.07	17204	< DL	11.7	30	21	669	2.82
SRK064	ANFF	< DL	0.3	64160	1.4	75	1830.1	0.9	0.01	15831	0.6	12.6	33	11	961	3.09
SRK070	ANFF	0.88	1.1	67652	1.8	< DL	1399	0.7	0.14	10078	0.2	17.8	54	52	1258	3.36
SRK090	ANFF	0.29	0.7	72629	1.7	< DL	2577.3	1.6	0.05	14271	0.2	23.1	56	79	2331	4.59
SRK096	ANFF	0.24	0.6	75684	1	< DL	1652.2	0.7	0.03	17759	< DL	18	60	27	929	3.68
SRK1B006	ANFF	0.07	0.4	85702	3.3	64	3203.5	0.9	0.05	1987	< DL	2.3	36	32	1002	3.07
SRK1B008	ANFF	0.01	0.3	79834	3	< DL	1539.7	1.1	0.02	19018	< DL	11.8	35	25	1334	2.96
SRK1B009	ANFF	1.38	0.7	83883	4.4	< DL	438.7	0.9	0.31	9355	< DL	23.7	55	59	1898	4.63
SRK1B033	ANFF	0.54	0.5	84001	2.4	< DL	1453.5	1.2	0.04	15283	0.5	28.4	47	71	1607	3.89
SRK1B037	ANFF	0.02	0.2	78014	3.3	< DL	1425.5	1	0.03	21814	0.1	16.1	39	22	1021	3.5
SRK1B041	ANFF	0.42	0.7	77992	10.6	< DL	652.7	1.8	0.2	8816	0.8	16.9	26	41	2375	4.09
SRK1B041	ANFF	0.51	0.6	73659	9.8	< DL	685.7	1.5	0.19	8663	0.2	16.7	34	33	2074	4.11
SRK1B051	ANFF	0.85	0.6	79886	10	< DL	484.9	1.2	0.4	6384	0.1	17.7	46	60	2140	5.07
SRK023	ANFQ	< DL	0.5	73889	1	< DL	1719.8	1.5	0.01	22974	0.2	13.6	54	18	709	2.96
SRK041	ANFQ	0.12	0.6	64906	1	< DL	1404.8	1.2	0.08	27773	< DL	19.2	61	39	1296	3.81
SRK049	ANFQ	< DL	0.5	70348	1	63	1568.3	1.2	0.03	26498	< DL	15.3	62	29	1083	3.08
SRK053	ANFQ	< DL	0.3	72560	0.5	< DL	1173.9	1.2	0.01	41387	< DL	20.4	85	18	705	3.8
SRK054	ANFQ	< DL	0.5	73799	0.9	82	1514.9	1.1	0.1	30884	0.1	16.6	80	34	1271	3.38
SRK055	ANFQ	0.01	0.3	72915	5.4	85	794.9	1.2	0.02	22505	< DL	11.5	52	11	509	3.17
SRK083	ANFQ	0.02	0.4	79555	1.1	65	1537.8	0.9	0.03	13290	< DL	13.7	65	37	971	2.84

Table D-7: Elemental Analysis (cont.)

Sample	Lithology	Au ppm	Ag ppm	Al ppm	As ppm	B ppm	Ba ppm	Be ppm	Bi ppm	Ca ppm	Cd ppm	Co ppm	Cr ppm	Cu ppm	F ppm	Fe %
SRK084	ANFQ	0.18	0.5	84395	2.7	< DL	1955.9	0.8	0.11	2082	0.1	7.4	51	22	885	3.93
SRK085	ANFQ	0.01	0.3	77575	36.6	< DL	962	1	0.07	26799	< DL	18.3	86	26	679	4.11
SRK1B010	ANFQ	0.12	0.7	78190	5.5	54	1094.5	1.1	0.08	2899	0.3	16.3	41	40	1092	3.23
SRK1B015	ANFQ	< DL	0.2	74574	3.8	79	1235.8	1.3	0.08	13489	0.1	21.6	63	27	1033	4.17
SRK1B017	ANFQ	0.01	0.2	62919	0.7	< DL	1559.7	0.7	0.02	18271	< DL	9.5	36	22	710	2.1
SRK1B018	ANFQ	0.01	0.2	64575	0.2	< DL	1075.5	0.5	0.02	16447	< DL	8.8	21	12	723	2.36
SRK1B028	ANFQ	0.01	< DL	73247	1.2	< DL	821.6	0.7	0.01	16927	< DL	7	22	15	544	1.94
SRK1B030	ANFQ	0.06	0.4	73429	10.5	< DL	1164.8	0.9	0.04	27042	0.1	21.7	30	29	915	3.02
SRK006	ANG	0.01	0.7	66482	29.8	< DL	183.2	0.5	0.34	47583	0.5	53.7	250	79	681	8.48
SRK019	ANG	< DL	0.3	67707	0.7	98	761.5	1	< DL	19433	< DL	24.6	99	60	838	4.74
SRK027	ANG	< DL	0.4	69769	2	100	315.6	0.5	0.05	71885	0.1	47.9	248	49	446	7.47
SRK038	ANG	< DL	0.3	78579	1.5	< DL	50.9	0.5	0.01	79763	0.2	58.6	308	76	221	9.29
SRK071	ANG	< DL	0.3	76611	8.6	50	755.8	0.7	0.01	26855	0.2	26.9	135	50	862	4.75
SRK009	ANGA	< DL	0.3	82259	1.1	< DL	56.3	0.2	< DL	76739	0.2	67.1	297	142	173	7.99
SRK011	ANGA	< DL	0.4	74201	0.6	88	183.4	< DL	< DL	65334	0.1	62.7	346	79	571	7.87
SRK015	ANGA	0.02	0.4	78639	0.5	< DL	178.6	0.3	0.04	80493	0.1	52.7	413	78	615	7.03
SRK028	ANGA	< DL	0.3	73329	0.7	< DL	655.5	0.6	0.09	76563	0.2	52.4	313	46	765	7.74
SRK030	ANGA	0.02	0.4	71663	1.1	< DL	829.7	1	0.02	25810	0.2	27.7	117	65	1091	5.31
SRK039	ANGA	0.01	0.3	77520	4.7	< DL	714.6	0.7	0.01	26872	< DL	22.1	65	37	471	4.43
SRK040	ANGA	< DL	0.3	75799	0.9	< DL	686.5	1.1	< DL	29086	0.1	22	89	32	620	4.44
SRK050	ANGA	< DL	0.3	80431	1	199	127.7	0.3	0.01	73806	0.2	62.7	295	128	188	8.24
SRK060	ANGA	< DL	0.4	70148	4.4	82	217	0.5	0.07	54130	0.7	50.9	290	71	627	7.73
SRK068	ANGA	< DL	0.4	71771	1.1	< DL	64.8	0.4	0.02	59451	0.4	58	223	107	1127	10.74
SRK069	ANGA	< DL	0.4	72676	1.4	55	105.4	0.3	0.02	63867	0.1	49.4	158	48	701	8.07
SRK091	ANGA	0.01	0.4	86265	1.8	< DL	99.5	0.2	0.02	62101	0.5	57.5	370	129	243	6.91
SRK1B005	ANGA	0.01	0.2	79332	1.6	< DL	171.2	0.4	0.03	62215	0.2	43.6	371	81	1108	7.25
SRK1B045	ANGA	0.02	0.3	79570	4	70	152.9	0.7	0.03	35123	0.3	42.8	171	146	570	8.8
SRK1B063	ANGA	0.01	0.4	77026	2.6	348*	386.6	0.3	0.03	59389	0.9	55.5	239	101	564	8.06
SRK1B065	ANGA	< DL	< DL	79546	1.7	< DL	75.6	0.3	< DL	77580*	0.2	55.3	215	100	387	8.78
SRK1B004	ANGQ	< DL	0.2	74425	2.2	62	169.8	0.4	0.03	65938	0.2	46.1	230	113	583	8.33
SRK1B019	ANGQ	0.07	0.2	83143	7.4	< DL	81	0.4	0.02	37171	0.2	52.3	255	125	514	10.23
SRK1B064	ANGQ	< DL	0.2	81104	2.4	53	77.6	0.2	0.03	74550	0.2	55	231	107	473	8.55
SRK1B013	APP	0.02	0.2	71245	3.1	65	2380.6	0.7	0.03	6222	0.1	10.4	20	20	311	1.55
SRK1B038	APP	< DL	0.3	77547	2.6	60	1168.4	0.6	0.02	21507	< DL	17.3	54	31	743	2.75
SRK1B046	APP	< DL	< DL	75624	1.1	132	117.7	0.1	0.03	68205	0.1	51.1	219	104	373	9.25
SRK088	AX	0.01	0.5	80276	168.9	114	558.7	0.6	0.08	19209	0.4	34	153	111	377	7.1
SRK1B066	AX	0.08	0.7	58005	94.6*	< DL	207.8	0.5	0.16	36643	1	91.4	286*	523*	556	12.12

Table D-7: Elemental Analysis (cont.)

Sample	Lithology	Au ppm	Ag ppm	Al ppm	As ppm	B ppm	Ba ppm	Be ppm	Bi ppm	Ca ppm	Cd ppm	Co ppm	Cr ppm	Cu ppm	F ppm	Fe %
SRK1B011	AZ	0.02	0.4	76751	10.4	90	222.3	0.7	0.05	21861	0.2	48.4	243	122	735	8.3
SRK1B025	AZ	< DL	0.5	74621	5.5	85	1220.5	0.7	0.04	9682	1.3	22.6	74	43	1270	4.11
SRK1B039	AZ	0.07	0.5	60745	6.2	84	305.2	0.5	0.26	9652	0.5	39.4	156	138	892	7.78
SRK1B043	AZ	< DL	0.2	71173	2.3	324	618.8	0.9	0.04	31216	0.2	40.6	63	8	863	8.54
SRK1B052	AZ	0.01	0.3	72698	5	114	346.3	0.5	0.03	48392	0.1	49.9	233	106	901	8.26
SRK080	AZB	0.08	0.7	71750	0.9	< DL	2513.7	1.5	0.13	21596	0.1	17.8	29	93	1445	3.48
SRK067	AZC	0.07	0.4	60859	2.2	53	2205.7	1.4	0.04	16584	< DL	19.7	61	54	1776	4.28
SRK1B053	AZC	< DL	0.4	74569	4.7	136	367.1	0.4	0.04	21902	0.3	57	270	103	861	8.07
SRK061	AZS	0.02	0.6	58780	6.7	64	764.3	0.8	0.04	13603	0.3	27.5	113	89	655	5.82
SRK063	MS	< DL	0.3	64257	6.3	138	461.7	0.5	0.29	670	< DL	1.8	79	18	259	3.1
SRK087	MS	< DL	0.3	56521	8.5	72	300.6	0.3	0.17	398	< DL	1.9	90	18	244	2.78
SRK062	PPB	0.02	0.6	63459	1.5	52	544.8	1.3	0.05	41302	0.1	32.6	10	3	700	9.35
SRK016	PPD	< DL	0.3	65154	1.4	51	492.5	0.7	0.02	48805	0.1	51	31	31	513	9.23
SRK043	PPD	0.01	0.3	64879	1.2	76	639.3	1	0.03	37899	< DL	43.2	10	18	718	9.41
SRK044	PPD	< DL	0.3	67146	1.6	120	666.7	0.8	0.03	39773	0.1	44.7	10	20	762	9.24
SRK093	QLSD	0.03	0.3	33503	4.5	< DL	95.5	0.2	0.09	2960	< DL	1.3	54	5	180	2.35
SRK094	QLSD	0.01	0.4	30456	3	< DL	57.2	0.4	0.14	1418	< DL	4.9	68	11	158	2.16
SRK013	TL	< DL	0.2	73845	4	< DL	30.8	0.6	0.08	488	< DL	1.3	62	6	165	1.4
SRK014	TL	< DL	0.3	58297	3.7	100	371.6	0.6	0.24	406	< DL	2.1	130	23	164	2.78
SRK024	TL	< DL	0.3	50870	5.2	105	407.1	0.5	0.26	419	< DL	1.4	112	29	246	2.23
SRK089	TL	0.02	0.3	82647	6.9	80	715.6	0.7	0.2	5318	< DL	4.8	82	15	460	2.88
SRK1B002	TL	0.02	< DL	59637	9.9	76	374.3	0.4	0.14	16394	< DL	28.2	162	60	346	9.84
SRK1B012	TL	0.04	0.2	66814	11	70	1510.4	0.7	0.25	2076	< DL	23.3	212	42	365	9.07
SRK1B022	TL	0.01	< DL	65781	11.9	73	313.2	0.5	0.22	27215	< DL	15.8	185	126	604	15.46
SRK1B027	TL	0.07	0.3	87537	14.7	64	500.2	0.8	0.47	1291	< DL	10.4	200	28	427	10.32
SRK1B035	TL	0.04	0.2	75538	9.3	86	1724.9	0.7	0.12	5344	< DL	3.4	132	24	546	7.13

Table D-7: Elemental Analysis (cont.)

Sample	Lithology	Hg	K	Li	Mg	Mn	Mo	Na	Nb	Ni	P	Pb	Rb	Sb	Se
		ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
SRK042	ALCY	0.02	8572	10.2	1809	438	1.4	1606	2.61	88	271	7	12.15	0.09	0.35
SRK081	ALCY	0.01	26451	20.7	5306	894	2.1	4406	2.15	27	249	136	84.88	1.86	0.02
SRK1B001	ALCY	< DL	16538		10381	912	4.1	5071		111	533	15		0.3	0.23
SRK1B001	ALCY	< DL	16567		10775	928	4.2	5289		111	530	15		0.33	0.25
SRK1B003	ALCY	< DL	31535		2406	116	8.8	3087		12	861	75		3.03*	0.22
SRK1B036	ALCY	< DL	3484		31379	2127	4.8	14131		145	276	4		0.18	0.28
SRK1B042	ALCY	< DL	6876		8282	1855	1.4	15359		184*	223	14		0.12	0.15
SRK1B044	ALCY	< DL	20272		2639	80	8.4	2371		6	1131	67		1.46	0.96
SRK037	AN	0.02	8402	12.7	6947	344	1	11368	1.51	80	63	14	20.52	0.24	0.05
SRK086	AN	< DL	33490	24.9	12502	904	3.5	11910	2.16	63	607	50	106.4	0.22	0.08
SRK066	ANA	< DL	14518	129	71240	1233	1.4	8932	1.93	170	296	< DL	30.09	0.06	0.21
SRK003	ANC RT	0.01	2250	10.4	11965	1209	3.4	2595	2.15	45	303	8	8.35	0.22	1.18
SRK004	ANC RT	0.02	2195	9.7	12442	1264	4.1	2433	2.11	49	315	20	8.23	0.24	1.42
SRK012	ANC RT	0.02	5550	19.4	16033	1166	6.6	4733	0.91	69	349	631	14.05	0.42	4.18
SRK025	ANC RT	0.02	143	5.5	20437	5314	4.5	420	0.19	56	456	< DL	0.7	< DL	0.79
SRK026	ANC RT	0.12	1494	9.3	26004	1758	4.6	7751	1.27	115	341	2	2.43	< DL	1.03
SRK029	ANC RT	< DL	14871	33.8	24135	810	6.4	17432	2.77	71	206	236	46.1	0.2	0.91
SRK034	ANC RT	0.02	2968	4.6	1509	459	5	1620	4.39	159	192	28	13.56	0.23	0.32
SRK074	ANC RT	< DL	1739	5.8	21720	1816	0.9	594	0.51	45	517	7	7.9	0.23	1.48
SRK075	ANC RT	< DL	20121	34	29752	977	4.6	6427	4.44	90	1091	155	48.46	0.44	0.56
SRK082	ANC RT	< DL	203	3.2	16519	1586	6.3	361	0.8	55	518	3	1.06	0.15	< DL
SRK1B007	ANC RT	< DL	14717		7867	162	3.7	6362		81	261	12		0.34	1.84
SRK1B029	ANC RT	< DL	6416		9409	551	4.9	2927		149	161	8		0.31	1.61
SRK1B061	ANC RT	< DL	8262		21649	1530	8.6	7923		104	490	23		0.24	3.77
SRK1B061	ANC RT	< DL	8694		22696	1607	9	8278		106	489	19		0.23	3.88
SRK1B062	ANC RT	< DL	13398		16394	1541	4.6	14596		49	1250	46		0.24	0.81
SRK010	ANF	0.01	19473	19.2	13842	452	2.1	25318	2.07	51	825	22	52.37	0.1	0.07
SRK046	ANF	0.01	24153	21.4	16062	498	3.6	25643	3.86	34	1510	21	46.12	0.06	0.03
SRK057	ANF	0.13	31464	24	17279	407	3.1	19410	2.31	63	818	28	71.47	0.1	0.05
SRK058	ANF	< DL	34082	25.7	14972	360	2.3	20880	2.52	52	804	30	100.95	0.05	0.07
SRK076	ANF	< DL	39151	52.9	24184	464	6.4	14325	1.55	50	1374	348	79.37	0.32	0.18
SRK077	ANF	< DL	40036	18.1	14852	1021	2.6	30159	9.09	32	1784	75	130.46	0.61	0.53
SRK078	ANF	< DL	19394	24	19955	801	2	25270	4.29	73	2122	21	57.4	0.18	0.34
SRK079	ANF	< DL	22743	22.2	8603	615	22.5	21201	2.09	25	444	58	71.26	0.11	0.11

Table D-7: Elemental Analysis (cont.)

Sample	Lithology	Hg	K	Li	Mg	Mn	Mo	Na	Nb	Ni	P	Pb	Rb	Sb	Se
		ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
SRK095	ANF	< DL	26505	27.1	16484	894	4.6	13024	2.39	93	445	71	71.9	0.15	0.13
SRK005	ANFA	0.01	25349	30.1	17803	554	2.3	24043	3.19	50	1333	32	65.83	0.08	0.05
SRK017	ANFA	0.02	30508	42.6	22571	511	2.6	19401	2.75	53	1262	21	66.43	0.06	0.13
SRK020	ANFA	0.02	35043	50.6	30141	450	2.5	14593	2.48	55	1171	6	69.23	0.08	0.06
SRK031	ANFA	0.01	22744	22.6	16216	503	3.7	24051	3.39	53	1266	22	55.43	0.07	0.08
SRK045	ANFA	0.02	28293	17	12731	450	2.4	23371	2.97	34	1264	19	72.51	0.16	0.04
SRK052	ANFA	< DL	22449	20.8	15807	487	1.1	23892	3.13	44	904	19	59.5	0.06	0.08
SRK059	ANFA	0.01	29000	24.8	15671	342	1.8	22664	2.25	38	1358	18	53.68	< DL	0.02
SRK092	ANFA	< DL	21198	17.6	10805	503	2	25119	2.07	44	976	24	77.34	0.09	0.03
SRK018	ANFA-GA	0.02	18201	42.4	25425	789	2.6	20787	4.43	84	892	15	50.49	0.06	0.14
SRK021	ANFF	0.16	44347	39.5	18411	368	2.9	18823	2.75	47	1857	16	109.54	0.09	0.3
SRK022	ANFF	0.01	29888	25.2	17813	409	4.4	19675	3.44	63	1043	17	87.75	0.19	0.48
SRK032	ANFF	0.01	34026	38.5	22884	405	2	18494	3.13	58	1067	22	78.59	0.09	0.1
SRK033	ANFF	0.02	43971	48.6	19441	287	12.7	20428	3.21	47	906	20	93.6	0.21	0.34
SRK035	ANFF	0.16	37019	37.4	21237	495	4.5	20099	2.87	55	1117	26	87.93	0.12	0.39
SRK036	ANFF	0.02	32800	31	20445	450	3.1	19976	1.76	57	1045	28	79.8	0.48	0.2
SRK051	ANFF	0.01	41653	17.1	14658	301	3	28760	1.24	36	1456	1326	71.27	0.55	0.44
SRK056	ANFF	0.16	43328	18.6	12330	380	1.5	23153	1.22	21	1269	27	74.52	0.1	0.14
SRK064	ANFF	< DL	39498	46.1	20760	420	3	15676	1.83	39	1261	30	70.68	0.08	0.03
SRK070	ANFF	< DL	49886	29.3	15668	344	17	20307	3.24	47	1381	37	115.5	0.17	0.87
SRK090	ANFF	< DL	43472	25.3	17514	778	1.7	25614	5.9	41	4026	32	111.68	0.17	0.25
SRK096	ANFF	< DL	34921	22.8	13707	458	3.2	26210	2.39	41	1008	46	82.85	0.08	0.59
SRK1B006	ANFF	< DL	44356		11393	107	1.6	10648		10	719	35		0.54	0.18
SRK1B008	ANFF	< DL	23897		14684	473	2.3	24318		29	1472	28		0.28	0.05
SRK1B009	ANFF	0.03	60475*		11747	381	7.1	18478		37	2064	64		0.87	0.54
SRK1B033	ANFF	< DL	34104		12733	476	4.3	24987		50	2572	120*		0.2	0.45
SRK1B037	ANFF	< DL	19501		11311	525	3.6	26989		32	1236	25		0.15	0.05
SRK1B041	ANFF	0.01	55392		14412	443	7.4	17925		25	4300	37		0.62	0.64
SRK1B041	ANFF	< DL	57613		14572	447	7.9	18488		25	4448	33		0.58	0.63
SRK1B051	ANFF	< DL	51049		11064	496	12.4	22458		37	1898	55		0.61	0.66
SRK023	ANFQ	< DL	27817	25.9	16435	411	3	24957	2.59	49	1333	43	61.06	0.09	0.1
SRK041	ANFQ	0.15	24509	19.6	18875	560	3.8	24253	2.44	53	1582	39	67.27	0.08	0.49
SRK049	ANFQ	0.01	21758	24.5	14066	443	3.8	23752	2.92	47	1218	25	65.56	0.07	0.15
SRK053	ANFQ	0.01	17418	20.6	19217	580	1.1	25694	3.08	55	1269	18	20.8	0.05	0.02
SRK054	ANFQ	< DL	25618	25.2	16812	516	2.7	20444	2.22	44	1121	29	71.89	0.06	0.21
SRK055	ANFQ	< DL	21448	26.1	19453	505	1.9	24499	2.64	36	696	22	49.18	0.1	0.04
SRK083	ANFQ	< DL	40116	22.3	16744	332	3.4	23374	1.69	46	1130	21	85.32	0.1	0.21

Table D-7: Elemental Analysis (cont.)

Sample	Lithology	Hg	K	Li	Mg	Mn	Mo	Na	Nb	Ni	P	Pb	Rb	Sb	Se
		ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
SRK084	ANFQ	0.05	45197	16.7	9743	130	4.1	25178	1.49	33	1155	25	102.43	0.11	0.18
SRK085	ANFQ	< DL	20283	13.4	18341	670	2.1	23916	3.37	50	681	11	62.8	0.19	0.12
SRK1B010	ANFQ	< DL	29175		14669	359	2.2	16539		38	934	56		0.66	0.13
SRK1B015	ANFQ	< DL	22816		14359	652	3	20785		52	758	33		0.22	0.21
SRK1B017	ANFQ	< DL	25453		5795	150	4.2	24506		28	644	22		0.15	0.04
SRK1B018	ANFQ	< DL	23154		9762	315	3.3	22931		13	451	21		0.18	0.02
SRK1B028	ANFQ	< DL	22750		9891	217	3.7	23564		16	235	18		0.12	0.02
SRK1B030	ANFQ	< DL	23259		10844	602	2.5	19733		30	1600	15		0.28	0.09
SRK006	ANG	0.02	10943	74.6	50290	2377	0.6	3905	1.91	168	220	126	24.01	0.32	0.22
SRK019	ANG	0.02	23774	52.7	27986	706	2.6	15309	2.68	80	564	16	51.65	0.06	0.14
SRK027	ANG	< DL	7211	21	30322	1613	2.4	15489	2.78	87	314	5	12.96	0.08	0.31
SRK038	ANG	0.01	3823	15.1	25610	2358	3.7	14461	2.22	169	266	5	5.88	0.11	0.25
SRK071	ANG	< DL	15794	24.6	21058	762	4.1	20670	2.28	89	556	31	39.36	0.12	0.13
SRK009	ANGA	< DL	1205	20.1	24715	1809	2	15616	2.49	192	309	4	1.01	< DL	0.35
SRK011	ANGA	0.01	4403	32.5	62174	1304	0.9	10169	1.26	279	124	6	8.27	< DL	0.17
SRK015	ANGA	0.02	3261	20.4	40360	1385	2.1	13897	1.71	97	218	13	5.74	< DL	0.21
SRK028	ANGA	< DL	5171	20.9	41985	1548	1.4	15086	2.84	111	247	14	9.39	< DL	0.24
SRK030	ANGA	< DL	16653	29.3	26274	1036	14.4	22676	3.7	79	695	34	54.9	< DL	0.22
SRK039	ANGA	0.01	15595	25	18705	638	1.2	23330	2.63	51	699	14	34.55	0.13	0.09
SRK040	ANGA	< DL	11873	16.8	17435	828	15.6	26114	3.28	51	688	20	33.35	0.06	0.1
SRK050	ANGA	0.02	8976	24.5	24848	1972	2.1	13293	2.25	164	256	11	18.02	0.06	0.33
SRK060	ANGA	< DL	9172	32.4	41740	1448	1.7	14948	3.09	112	381	22	17.84	0.07	0.29
SRK068	ANGA	< DL	4662	12.4	35825	1892	1	17260	4.21	107	332	3	8.07	< DL	0.07
SRK069	ANGA	< DL	3692	20.4	40268	1364	2.2	20012	2.61	67	651	11	8.09	0.45	0.11
SRK091	ANGA	< DL	10613	20	22059	1881	1.6	14910	1.85	162	256	3	20.23	< DL	0.13
SRK1B005	ANGA	< DL	8592		44359*	1383	2.8	14443		132	238	6		0.32	0.18
SRK1B045	ANGA	< DL	6474		21974	1965	5.8	20248		85	323	8		0.1	0.67
SRK1B063	ANGA	< DL	15274		40213	1550	1.1	10780		179	210	17		0.1	0.26
SRK1B065	ANGA	< DL	2754		28156	2063	0.9	14770		152	320	3		0.07	0.29
SRK1B004	ANGQ	< DL	7231		32116	1528	2.7	14128		68	231	6		0.34	0.25
SRK1B019	ANGQ	< DL	5348		13534	2700*	1.9	11220		180	325	4		0.13	0.04
SRK1B064	ANGQ	< DL	4593		29733	1981	1.1	14647		159	266	4		0.08	0.26
SRK1B013	APP	< DL	33796		5268	150	3.9	17363		21	203	37		0.23	0.05
SRK1B038	APP	< DL	18501		7512	192	2.8	27173		34	635	26		0.16	0.04
SRK1B046	APP	< DL	9826		22660	2420*	4.2	11816		121	296	3		0.11	0.29

Table D-7: Elemental Analysis (cont.)

Sample	Lithology	Hg	K	Li	Mg	Mn	Mo	Na	Nb	Ni	P	Pb	Rb	Sb	Se
		ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
SRK088	AX	< DL	18520	25.8	20360	1482	3.9	13923	1.91	88	388	23	40.27	0.17	0.6
SRK1B066	AX	< DL	6208		17444	1231	5.1	11706		319*	264	15		0.1	7.36
SRK1B011	AZ	< DL	12722		37777	1298	3.7	15246		115	406	14		0.35	0.39
SRK1B025	AZ	< DL	20215		27673	462	3.3	7618		51	894	63		0.22	0.12
SRK1B039	AZ	< DL	12923		29060	744	2.9	12653		84	489	47		0.23	0.54
SRK1B043	AZ	< DL	19754		36489	1118	1.6	20052		11	1025	8		0.16	0.22
SRK1B052	AZ	< DL	14794		47290*	1631	1.2	9399		114	680	7		0.26	0.31
SRK080	AZB	< DL	47325	34.2	25218	639	3.4	19560	5.2	37	3305	54	84.31	0.21	0.18
SRK067	AZC	< DL	40534	46.4	22556	658	4	19674	6.39	47	2835	11	113.86	0.14	0.12
SRK1B053	AZC	< DL	12106		37595	1361	2.1	15751		124	573	11		0.18	0.38
SRK061	AZS	< DL	32570	59.6	32537	759	5.1	7187	2.89	82	762	20	62.63	0.23	0.34
SRK063	MS	< DL	8467	9.7	2215	46	2.3	1262	8.89	7	67	12	19.96	0.2	1.52
SRK087	MS	< DL	5343	8	1673	56	2.6	1164	6.59	9	127	30	16.2	0.16	0.79
SRK062	PPB	< DL	13552	30.8	22834	1290	1.8	24782	16.5	< DL	1428	16	36.17	0.22	0.04
SRK016	PPD	0.01	12840	42.1	35949	1258	1	19343	3.68	40	1235	13	31.18	0.13	0.1
SRK043	PPD	< DL	16051	18.9	25120	1140	1.3	25042	5.37	15	1805	11	29.76	0.11	0.06
SRK044	PPD	0.02	18364	20	26181	1152	1.2	21452	5.25	15	1849	11	36.44	0.15	0.07
SRK093	QLSD	< DL	819	6.5	647	39	1.4	380	3.99	8	34	4	5.93	0.13	0.38
SRK094	QLSD	< DL	2153	14.3	1126	178	1.8	276	4.33	23	66	9	18.18	0.24	0.08
SRK013	TL	0.01	788	17.9	540	36	6	783	7.93	15	41	11	4.01	0.1	0.09
SRK014	TL	0.01	6741	19.7	1675	53	4.6	791	8.47	24	51	12	14.69	0.13	0.09
SRK024	TL	0.01	7113	10.9	1742	60	6.6	841	8.8	10	56	11	14.72	0.18	0.17
SRK089	TL	< DL	10093	19	5313	73	1.3	2821	5.67	23	255	35	33.1	0.28	1.14
SRK1B002	TL	< DL	5235		4596	196	1.1	3464		97	218	8		0.54	0.79
SRK1B012	TL	< DL	4750		3482	104	3.1	3461		59	75	16		0.46	0.39
SRK1B022	TL	< DL	5568		11101	263	1.5	4032		103	336	12		0.3	1.19
SRK1B027	TL	< DL	6042		2802	256	2.2	1928		34	149	27		0.69	0.61
SRK1B035	TL	< DL	19788		5519	91	3.5	2724		12	412	27		0.62	1.01

Table D-7: Elemental Analysis (cont.)

Sample	Lithology	Si	Sn	Sr	Te	Th	Ti	Tl	U	V	W	Y	Zn	Zr
		%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
SRK042	ALCY	21.9	0.8	9.53	0.1	2.84	8291	0.08	0.45	308	0.5	2.44	78	25.6
SRK081	ALCY	32.7	1.4	187.43	0.1	14.01	2122	1.1	1.24	51	1.6	47.89	182	125.5
SRK1B001	ALCY	29.1	0.2	79.64		10.87		0.98	1.08	190			243	
SRK1B001	ALCY	29.9	0.2	82.42		11.04		0.98	1.09	195			244	
SRK1B003	ALCY	28.3	0.6	1259.59		25.5		1.67	2.5	123			27	
SRK1B036	ALCY	22.6	0.6	136.24		0.71		0.06	0.05	331			87	
SRK1B042	ALCY	21.2	0.8	144.11		2.04		0.2	0.33	391*			365	
SRK1B044	ALCY	25	0.7	547.43		38.86		0.51	2.68	171			20	
SRK037	AN	27.3	0.5	23.49	0.1	0.46	4955	0.13	0.27	278	0.6	3.6	86	26
SRK086	AN	30.2	0.7	445.14	1.1	15.8	2435	1.09	1.31	83	3	25.23	130	90.6
SRK066	ANA	21.8	0.7	45.44	0.1	0.39	4587	0.16	0.1	244	0.4	16.17	56	25
SRK003	ANC RT	37.1	0.7	30.55	0.4	1.16	653	0.23	0.34	15	0.4	6.19	207	40.3
SRK004	ANC RT	36.8	1.4	29	0.5	1.31	643	0.24	0.41	15	0.4	6.47	222	41.6
SRK012	ANC RT	34.1	0.6	72.67	1.4	2.75	712	0.32	0.63	47	0.5	7.95	1523	55.8
SRK025	ANC RT	31.6	0.3	8.28	0.7	0.12	199	0.03	0.04	17	0.2	13.09	86	6.5
SRK026	ANC RT	29.3	0.5	88.06	0.4	0.24	2461	0.04	0.06	147	0.5	16.86	104	18.6
SRK029	ANC RT	28.7	0.8	378.15	0.4	11.91	3186	0.46	0.81	133	1	9.18	1078	82.7
SRK034	ANC RT	27.9	0.7	8.73	0.9	3.33	4764	0.1	0.51	306	1.6	3.55	223	55.4
SRK074	ANC RT	31.9	1.6	11.19	0.5	0.19	306	0.25	0.05	12	0.2	9.96	553	10.1
SRK075	ANC RT	28.1	0.7	224.65	0.2	7.74	2634	0.59	1.14	121	2.1	12.89	242	141.8
SRK082	ANC RT	34	0.7	12.26	0.2	1.28	376	0.05	0.34	28	3.3	9.47	89	18.2
SRK1B007	ANC RT	28.9	0.6	147.33		4.66		2.96	1.15	52			157	
SRK1B029	ANC RT	25.7	0.7	30.14		1.83		0.97	0.43	42			127	
SRK1B061	ANC RT	26.7	1.3	136.69		2.79		0.47	0.57	152			540	
SRK1B061	ANC RT	26.6	1.3	140.41		2.9		0.48	0.59	158			563	
SRK1B062	ANC RT	27.7	0.8	212.77		7.77		0.52	0.72	113			224	
SRK010	ANF	30.7	0.8	556.13	0.4	3.83	2419	0.45	0.27	65	0.3	4.56	66	65.3
SRK046	ANF	29.8	1.2	936.02	0.1	2.72	3570	0.37	0.37	81	0.9	6.41	72	61.8
SRK057	ANF	31.4	0.7	612.16	0.5	8.75	2935	0.62	0.46	89	0.4	5.89	79	103
SRK058	ANF	31.1	0.7	781.08	0.3	29.32	2698	0.82	0.82	77	0.4	6.54	61	117.9
SRK076	ANF	28.7	2.1	518.94	1.3	5.51	1868	0.61	0.45	79	0.3	9.24	1078	84.2
SRK077	ANF	26.8	1	1779	1	58.38	2968	1.41	8.14	105	3.1	19.83	113	517.8

Table D-7: Elemental Analysis (cont.)

Sample	Lithology	Si	Sn	Sr	Te	Th	Ti	Tl	U	V	W	Y	Zn	Zr
		%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
SRK078	ANF	28.8	1.1	1066.6	0.2	6.6	3724	0.79	0.49	112	1.7	11.38	99	76.4
SRK079	ANF	32.8	0.8	637	0.1	14.33	2427	0.49	0.52	48	16.5	4.11	107	75.8
SRK095	ANF	31.9	0.3	207.04	0.2	20.93	2465	0.39	0.8	120	1.1	20.06	161	126.9
SRK005	ANFA	30.8	1.2	756.57	< DL	2.04	2796	0.6	0.27	76	0.4	5.58	85	59.2
SRK017	ANFA	30	1	608.82	0.2	6.57	2766	0.61	0.49	77	0.2	8.91	60	74.7
SRK020	ANFA	28.8	0.9	277.87	0.1	4.36	2577	0.47	0.47	82	0.5	9.04	49	74.5
SRK031	ANFA	30.2	0.9	883.01	0.1	4.03	3239	0.45	0.45	82	0.3	6.54	91	71.3
SRK045	ANFA	31	0.9	875.41	0.1	6.74	2473	0.51	0.37	57	0.7	8.91	63	80.5
SRK052	ANFA	31	0.8	1315.6	0.1	6.35	2771	0.48	0.63	80	0.2	6.78	73	92.2
SRK059	ANFA	31.2	0.9	920.74	< DL	3.58	2409	0.4	0.33	61	0.3	6.51	62	69.1
SRK092	ANFA	32.8	0.6	512.99	0.9	6.1	2267	0.59	0.59	60	0.8	5.61	83	68.9
SRK018	ANFA-ANGA	29.2	1.2	568.36	0.1	4.62	3991	0.42	0.45	128	0.5	13	79	56.4
SRK021	ANFF	29.5	0.8	651.34	0.6	10.31	2560	0.81	1.03	76	0.8	9.08	52	138.4
SRK022	ANFF	30.5	4.7	610.17	0.4	12.7	2731	0.69	1.88	69	3	8.82	64	146.9
SRK032	ANFF	28.2	1.1	566.18	3.2	6.41	3136	0.59	0.54	88	0.4	5.94	68	80
SRK033	ANFF	30.3	0.9	488.23	0.2	18.37	2813	0.91	2.55	76	2.5	8.74	271	152
SRK035	ANFF	29.3	1	551.89	0.7	13.07	2818	0.68	0.95	92	4.1	9.53	70	101.3
SRK036	ANFF	29.6	1	611.98	0.3	3.38	2190	0.7	0.35	64	0.8	6.48	67	53.7
SRK051	ANFF	29.4	1.9	843.36	0.8	6.06	1967	0.59	0.45	65	1	6.74	254	84.3
SRK056	ANFF	30.7	0.6	1201.8	0.3	6.56	1480	0.59	0.37	50	0.3	8.56	48	67
SRK064	ANFF	31.1	0.8	488.89	< DL	3.28	1989	0.45	0.41	63	0.7	7.27	171	71.6
SRK070	ANFF	30	0.9	540.49	1	26.57	2710	0.96	2.58	77	2.7	9.75	92	208.1
SRK090	ANFF	26.9	1.3	1266.7	0.2	22.75	4311	1.19	2.32	134	2.3	16.44	117	222
SRK096	ANFF	30.1	0.9	782.63	0.6	11.06	2563	0.58	0.39	73	2.3	6.09	67	58.9
SRK1B006	ANFF	27.1	0.7	731.96		13.15		3.03	1.49	99			70	
SRK1B008	ANFF	28.7	0.9	899.31		4.45		0.76	0.6	106			84	
SRK1B009	ANFF	26.6	0.9	1039.05		28.71		1.9	3.25	133			123	
SRK1B033	ANFF	26.3	0.9	1177.42		45.92		0.89	1.8	116			226	
SRK1B037	ANFF	29.8	0.7	938.81		5.24		0.44	0.56	77			77	
SRK1B041	ANFF	26.9	0.7	796.7		33.45		1.78	6.05	103			101	
SRK1B041	ANFF	27	0.7	755.64		33.22		1.81	5.83	105			105	
SRK1B051	ANFF	28.1	1	641.91		24.25		1.61	2.68	104			105	
SRK023	ANFQ	31.1	1.1	867.33	0.1	8.41	2577	0.48	0.44	65	0.3	8.85	80	78.8
SRK041	ANFQ	30.7	1.2	711.07	1.6	8.96	2957	0.7	1.31	83	0.7	9.18	84	96.7
SRK049	ANFQ	31.3	2.1	825.29	0.2	10.77	2773	0.51	0.54	69	0.5	7.43	74	103.9

Table D-7: Elemental Analysis (cont.)

Sample	Lithology	Si	Sn	Sr	Te	Th	Ti	Tl	U	V	W	Y	Zn	Zr
		%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
SRK053	ANFQ	29.5	0.9	914.49	0.1	0.65	3308	0.24	0.24	91	0.3	8.9	72	51.7
SRK054	ANFQ	31.1	1.2	593.35	0.7	6.79	2697	0.61	0.62	73	0.2	6.92	87	91.9
SRK055	ANFQ	31.3	0.6	719.19	0.1	3.48	2178	0.32	0.89	60	0.3	4.86	85	44.8
SRK083	ANFQ	31.4	0.7	558.82	0.2	5.77	2056	0.59	0.66	60	3.4	6.93	60	82.5
SRK084	ANFQ	30.6	0.6	686.5	0.7	13.61	1740	0.66	1.02	67	1.6	6.75	54	87.2
SRK085	ANFQ	29.9	0.9	664.28	0.1	5.4	3269	0.48	0.57	90	2.6	9.73	105	83.9
SRK1B010	ANFQ	30.9	0.8	239		20.76		0.5	0.9	92			157	
SRK1B015	ANFQ	29.9	0.5	573.64		9.3		0.46	0.77	97			117	
SRK1B017	ANFQ	31.2	0.6	720.24		13.63		0.47	0.52	48			44	
SRK1B018	ANFQ	31.6	0.7	461.31		17.63		0.34	0.65	61			48	
SRK1B028	ANFQ	31.9	0.4	437.72		5.71		0.27	0.37	42			38	
SRK1B030	ANFQ	28.4	0.7	329.17		9.31		0.51	0.58	72			57	
SRK006	ANG	21.9	0.9	38.97	0.7	0.34	4326	0.52	0.07	233	0.8	13.96	167	16.5
SRK019	ANG	28.9	0.9	417.88	0.6	4.34	2817	0.41	0.3	108	0.3	14.82	50	59.2
SRK027	ANG	24.6	0.8	229.02	0.2	0.56	5112	0.08	0.14	255	0.6	17.9	76	41.3
SRK038	ANG	23.8	1.1	140.88	0.1	0.19	5506	0.07	0.05	267	3	20.2	101	22.1
SRK071	ANG	29	0.3	477.26	0.1	3.12	3794	0.33	0.35	130	0.8	12	111	58.8
SRK009	ANGA	25.1	0.9	106.23	0.4	0.09	6074	0.04	0.04	279	0.2	20.22	115	17.3
SRK011	ANGA	22.2	0.6	98.63	0.2	0.09	3692	0.08	0.02	206	0.2	13.41	76	20.4
SRK015	ANGA	23.4	0.7	118.66	0.1	0.2	4480	0.06	0.13	244	0.3	15.32	77	28.9
SRK028	ANGA	24.1	1.5	154.89	0.1	0.82	5057	0.1	0.66	245	0.8	17.07	72	42.2
SRK030	ANGA	29	0.3	573.09	0.3	9.25	4403	0.48	0.42	150	0.2	9.96	135	123
SRK039	ANGA	29.7	1.2	444.94	< DL	3.89	3395	0.24	0.56	103	0.5	10.5	69	82.8
SRK040	ANGA	30.8	0.3	696.7	< DL	12.55	3504	0.27	0.56	120	0.1	12.22	87	94.5
SRK050	ANGA	25.1	1.3	172.45	< DL	0.23	5618	0.14	0.09	269	0.1	19.97	91	20.9
SRK060	ANGA	25.4	0.8	201.38	0.1	0.85	4168	0.16	0.45	212	1.8	18.26	191	44
SRK068	ANGA	23.9	1.2	131.32	< DL	0.36	7004	0.08	0.07	294	0.4	25.57	122	51.8
SRK069	ANGA	23.3	1.1	301.89	< DL	0.8	5322	0.07	0.1	218	1.3	20.26	95	59
SRK091	ANGA	25.9	0.6	174.33	0.1	0.25	5089	0.15	0.04	258	1.6	17.75	74	14.1
SRK1B005	ANGA	22.5	0.5	177.99		0.82		0.08	0.12	247			94	
SRK1B045	ANGA	25.8	0.6	232.32		0.68		0.06	0.26	223			151	
SRK1B063	ANGA	22.3	0.5	171.01		0.13		0.14	0.04	298			346	
SRK1B065	ANGA	23	0.5	175.97		0.29		0.03	0.07	322			102	
SRK1B004	ANGQ	22.7	0.6	189.05		1.08		0.08	0.2	334			81	
SRK1B019	ANGQ	25.2	0.5	117.52		0.36		0.05	0.2	313			123	

Table D-7: Elemental Analysis (cont.)

Sample	Lithology	Si	Sn	Sr	Te	Th	Ti	Tl	U	V	W	Y	Zn	Zr
		%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
SRK1B064	ANGQ	23	0.5	166.16		0.25		0.04	0.04	319			107	
SRK1B013	APP	33.4*	0.5	577.2		28.71		0.65	1	25			52	
SRK1B038	APP	30.7	0.5	721.2		59.99		0.34	0.71	55			45	
SRK1B046	APP	23.5	0.6	184.94		0.68		0.07	0.06	343			88	
SRK088	AX	28.1	0.3	297.77	0.3	4.92	1877	0.36	0.61	127	3.2	17.5	169	97.6
SRK1B066	AX	25.8	0.5	116.78		1.33		0.4	0.28	195			461	
SRK1B011	AZ	25.1	0.6	157.39		1.71		0.2	0.5	258			143	
SRK1B025	AZ	28.2	0.3	107.7		9.18		0.48	0.63	109			284	
SRK1B039	AZ	27.9	0.7	81.34		0.68		0.13	0.18	144			140	
SRK1B043	AZ	23.7	1.3	369.91		2.88		0.18	0.63	252			130	
SRK1B052	AZ	20.8	0.7	143.49		3.94		0.17	0.24	321			95	
SRK080	AZB	26.5	1.4	414.55	0.2	23.26	2658	0.7	3.19	87	3.7	16.38	100	222.5
SRK067	AZC	27.2	1.3	651.52	0.3	21.05	3977	1.35	1.73	124	1.4	17.46	148	205.7
SRK1B053	AZC	25.6	0.6	202.66		1.14		0.16	0.27	247			174	
SRK061	AZS	29	0.5	93.87	0.2	3.52	3331	0.46	0.47	122	1	12.14	192	79.7
SRK063	MS	37.9	1.5	27.94	0.1	5.51	5868	0.13	1.18	100	2.2	3.63	15	130.8
SRK087	MS	37.8	1.1	36.21	0.1	4.94	5010	0.15	0.71	101	2.6	2.49	16	81.1
SRK062	PPB	26.9	1.9	678.91	0.1	5.3	9246	0.28	1.04	261	0.5	34.07	115	196.8
SRK016	PPD	23.6	1.1	498.15	< DL	0.92	7015	0.35	0.19	260	0.4	24.82	100	94.9
SRK043	PPD	25.3	1.5	419.38	< DL	1.63	8581	0.23	0.33	271	0.4	28.27	124	110.1
SRK044	PPD	24.6	1.3	489.38	< DL	1.69	8433	0.31	0.34	274	0.7	28.44	118	113.5
SRK093	QLSD	35.8	1.2	16.75	< DL	4.76	1632	0.08	0.36	35	0.8	1.64	7	56.9
SRK094	QLSD	42	1.3	23.37	< DL	4.84	2133	0.16	0.4	53	0.5	3.56	16	38.1
SRK013	TL	36.1	1.3	7.25	0.1	14.12	2698	0.06	0.8	38	1.4	3.97	17	186.6
SRK014	TL	36.8	1.5	15.93	1	5.83	6880	0.1	0.87	99	1.7	3.99	22	115
SRK024	TL	38.7	1.4	16.93	0.1	7.19	6690	0.09	0.81	84	2.4	3.08	15	120.2
SRK089	TL	31.2	1.8	154.07	0.1	15.64	3269	0.26	1.72	107	2.4	4.72	30	108.5
SRK1B002	TL	27	1.1	99.24		5.65		0.16	0.94	205			115	
SRK1B012	TL	29.5	1.3	60.5		12.8		0.14	0.86	287			44	
SRK1B022	TL	19.9	1.3	136.86		7.55		0.13	1.06	300			101	
SRK1B027	TL	28.3	2.2*	48.52		21.11		0.26	1.51	344*			31	
SRK1B035	TL	29.2	0.9	257.98		12.58		0.52	1.33	250			22	

Table D-8: Calculated Global Abundance Indices (GAI) - Major Elements

Sample	Lithology	Al	Ca	Fe	K	Mg	Mn	Na	P	S	Si
SRK1B001	ALCY	-1	-6	-1	-1	-2	-1	-3	-2	0	-1
SRK1B002	TL	-2	-2	0	-3	-3	-3	-4	-3	1	-1
SRK1B003	ALCY	-1	-8	-2	0	-4	-4	-4	-1	0	-1
SRK1B004	ANGQ	-1	0	0	-3	-1	0	-2	-3	2	-1
SRK1B005	ANGA	-1	0	0	-2	0	-1	-2	-3	1	-1
SRK1B006	ANFF	-1	-5	-2	0	-2	-4	-2	-2	2	-1
SRK1B007	ANC	-2	-5	0	-2	-3	-4	-3	-3	7	-1
SRK1B008	ANFF	-1	-2	-2	-1	-2	-2	-1	-1	2	-1
SRK1B009	ANFF	-1	-3	-1	0	-2	-2	-1	0	5	-1
SRK1B010	ANFQ	-1	-5	-1	-1	-2	-2	-2	-1	4	-1
SRK1B011	AZ	-1	-2	0	-2	0	-1	-2	-2	4	-1
SRK1B012	TL	-1	-5	0	-3	-4	-4	-4	-5	0	-1
SRK1B013	APP	-1	-4	-2	0	-3	-4	-1	-3	3	-1
SRK1B015	ANFQ	-1	-3	-1	-1	-2	-2	-1	-1	4	-1
SRK1B016	AN?	-1	-6	-1	-1	-2	-3	-2	-1	2	-1
SRK1B017	ANFQ	-1	-2	-2	-1	-3	-4	-1	-2	3	-1
SRK1B018	ANFQ	-1	-2	-2	-1	-2	-3	-1	-2	1	-1
SRK1B019	ANGQ	-1	-1	0	-3	-2	0	-2	-3	-2	-1
SRK1B020	ANFF	-1	-4	-1	-1	-2	-2	-1	0	-2	-1
SRK1B021	ANF	-1	-2	-1	-1	-1	-1	-1	0	4	-1
SRK1B022	TL	-1	-2	1	-3	-2	-3	-4	-3	1	-2
SRK1B023	ANF	-1	-4	-2	-1	-2	-2	-1	0	-1	-1
SRK1B024	AN?	-1	-5	-1	-1	-3	-3	-1	-1	1	-1
SRK1B025	AZ	-1	-3	-1	-1	-1	-2	-3	-1	3	-1
SRK1B026	AZC	-1	-4	-1	0	-1	-2	-1	0	3	-1
SRK1B027	TL	-1	-6	0	-3	-4	-3	-5	-4	-1	-1
SRK1B028	ANFQ	-1	-2	-2	-1	-2	-3	-1	-3	1	-1
SRK1B029	ANC	-3	-5	1	-3	-2	-2	-4	-4	8	-1
SRK1B030	ANFQ	-1	-2	-2	-1	-2	-2	-1	0	4	-1
SRK1B031	ANFF	-1	-4	-1	0	-2	-2	-1	-1	6	-1
SRK1B032	ANCA	-3	-5	2	-3	-3	-3	-3	-4	8	-1
SRK1B033	ANFF	-1	-3	-1	0	-2	-2	-1	0	4	-1
SRK1B034	ANFQ	-1	-7	-1	0	-4	-4	-2	-1	3	-1
SRK1B035	TL	-1	-4	0	-1	-3	-4	-4	-2	0	-1
SRK1B036	ALCY	-1	0	0	-4	-1	0	-2	-3	1	-1
SRK1B037	ANFF	-1	-2	-1	-1	-2	-2	-1	-1	3	-1
SRK1B038	APP	-1	-2	-2	-1	-3	-3	-1	-2	4	-1
SRK1B039	AZ	-2	-3	0	-2	-1	-1	-2	-2	5	-1
SRK1B040	ANFF	-1	-3	-1	-1	-2	-2	-1	0	4	-1
SRK1B041	ANFF	-1	-3	-1	0	-2	-2	-1	1	5	-1
SRK1B042	ALCY	-1	-2	0	-3	-3	0	-2	-3	-1	-1

Table D-8: Calculated Global Abundance Indices (GAI) - Major Elements (cont.)

Sample	Lithology	Al	Ca	Fe	K	Mg	Mn	Na	P	S	Si
SRK1B043	AZ	-1	-1	0	-1	0	-1	-1	-1	2	-1
SRK1B044	ALCY	-1	-8	-1	-1	-4	-5	-4	-1	3	-1
SRK1B045	ANGA	-1	-1	0	-3	-1	0	-1	-3	4	-1
SRK1B046	APP	-1	0	0	-2	-1	0	-2	-3	2	-1
SRK1B047	ANFF	-1	-2	-1	0	-1	-2	-1	1	5	-1
SRK1B048	ANFF	-1	-2	-1	0	-1	-1	-1	1	4	-1
SRK1B049	ANFQ	-1	-3	-1	0	-2	-2	-1	0	5	-1
SRK1B050	ANFF	-1	-3	-1	0	-2	-2	-1	0	6	-1
SRK1B051	ANFF	-1	-4	-1	0	-2	-2	-1	0	5	-1
SRK1B052	AZ	-1	-1	0	-2	0	0	-2	-2	3	-1
SRK1B053	AZC	-1	-2	0	-2	0	-1	-2	-2	3	-1
SRK1B061	ANC	-2	-2	1	-2	-1	0	-3	-2	7	-1
SRK1B062	ANC	-2	-2	0	-2	-2	0	-2	-1	5	-1
SRK1B063	ANGA	-1	-1	0	-2	0	0	-2	-3	2	-1
SRK1B064	ANGQ	-1	0	0	-3	-1	0	-2	-3	1	-1
SRK1B065	ANGA	-1	0	0	-4	-1	0	-2	-3	1	-1
SRK1B066	AX	-2	-1	0	-3	-1	-1	-2	-3	6	-1

Note: Grey shading indicated GAI values > 2.

Table D-8: Calculated Global Abundance Indices (GAI)

Sample	Major Unit	Au	Ag	Al	As	B	Ba	Be	Bi	Ca	Cd	Co	Cr	Cu	F	Fe	Hg	K	Mg	Mn	Mo	Na	Ni
SRK003	ANC RT	4	2	0	5	Low	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
SRK004	ANC RT	4	2	0	4	Low	0	0	2	0	1	0	0	1	0	0	0	0	0	0	0	0	0
SRK005	ANFA	2	1	0	0	1	0	0	0	0	Low	0	0	0	0	0	0	0	0	0	0	0	0
SRK006	ANG	2	2	0	3	Low	0	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0
SRK009	ANGA	Low	1	0	0	Low	0	0	Low	0	0	1	0	0	0	0	Low	0	0	0	0	0	0
SRK010	ANF	2	1	0	0	Low	0	0	0	0	Low	0	0	0	0	0	0	0	0	0	0	0	0
SRK011	ANGA	Low	1	0	0	2	0	Low	Low	0	0	1	1	0	0	0	0	0	0	0	0	0	1
SRK012	ANC RT	3	3	0	5	2	0	0	2	0	5	0	0	1	0	0	0	0	0	0	1	0	0
SRK013	TL	Low	0	0	0	Low	0	0	0	0	Low	0	0	0	0	0	0	0	0	0	1	0	0
SRK014	TL	Low	1	0	0	2	0	0	1	0	Low	0	0	0	0	0	0	0	0	0	1	0	0
SRK015	ANGA	3	1	0	0	Low	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
SRK016	PPD	Low	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SRK017	ANFA	3	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SRK018	ANFA-ANGA	2	1	0	0	2	0	0	Low	0	Low	0	0	0	0	0	0	0	0	0	0	0	0
SRK019	ANG	Low	1	0	0	2	0	0	Low	0	Low	0	0	0	0	0	0	0	0	0	0	0	0
SRK020	ANFA	Low	1	0	0	2	0	0	0	0	Low	0	0	0	0	0	0	0	0	0	0	0	0
SRK021	ANFF	7	2	0	0	2	1	0	0	0	Low	0	0	0	0	0	1	0	0	0	0	0	0
SRK022	ANFF	5	2	0	0	Low	0	0	3	0	Low	0	0	2	0	0	0	0	0	0	0	0	0
SRK023	ANFQ	Low	2	0	0	Low	1	0	0	0	0	0	0	0	0	0	Low	0	0	0	0	0	0
SRK024	TL	Low	1	0	1	2	0	0	1	0	Low	0	0	0	0	0	0	0	0	0	1	0	0
SRK025	ANC RT	5	1	0	7	Low	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	0	0
SRK026	ANC RT	6	1	0	4	Low	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0
SRK027	ANG	Low	1	0	0	2	0	0	0	0	0	0	0	0	0	0	Low	0	0	0	0	0	0
SRK028	ANGA	Low	1	0	0	Low	0	0	0	0	0	0	1	0	0	0	Low	0	0	0	0	0	0
SRK029	ANC RT	3	2	0	1	2	0	0	0	0	5	0	0	0	0	0	Low	0	0	0	1	0	0
SRK030	ANGA	3	1	0	0	Low	0	0	0	0	0	0	0	0	0	0	Low	0	0	0	2	0	0
SRK031	ANFA	2	1	0	0	Low	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Notes: ‘Low’ indicates concentration was below detection limit.

Table D-8: Calculated Global Abundance Indices (GAI) (cont.)

Sample	Major Unit	Au	Ag	Al	As	B	Ba	Be	Bi	Ca	Cd	Co	Cr	Cu	F	Fe	Hg	K	Mg	Mn	Mo	Na	Ni
SRK032	ANFF	2	1	0	0	Low	1	0	0	0	Low	0	0	0	0	0	0	0	0	0	0	0	0
SRK033	ANFF	4	2	0	0	2	1	0	0	0	2	0	0	0	0	0	0	0	0	0	2	0	0
SRK034	ANC RT	Low	1	0	4	2	0	0	0	0	0	0	2	1	0	0	0	0	0	0	1	0	0
SRK035	ANFF	8	2	0	0	2	1	0	0	0	Low	0	0	0	0	0	1	0	0	0	1	0	0
SRK036	ANFF	5	2	0	0	2	0	0	0	0	Low	0	0	0	0	0	0	0	0	0	0	0	0
SRK037	AN	Low	1	0	0	3	0	0	0	0	Low	0	0	0	0	0	0	0	0	0	0	0	0
SRK038	ANG	Low	1	0	0	Low	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
SRK039	ANGA	2	1	0	1	Low	0	0	0	0	Low	0	0	0	0	0	0	0	0	0	0	0	0
SRK040	ANGA	Low	1	0	0	Low	0	0	Low	0	0	0	0	0	0	0	Low	0	0	0	2	0	0
SRK041	ANFQ	6	2	0	0	Low	0	0	0	0	Low	0	0	0	0	0	1	0	0	0	0	0	0
SRK042	ALCY	Low	0	0	0	3	0	0	0	0	Low	0	1	0	0	0	0	0	0	0	0	0	0
SRK043	PPD	2	1	0	0	2	0	0	0	0	Low	0	0	0	0	0	Low	0	0	0	0	0	0
SRK044	PPD	Low	1	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SRK045	ANFA	Low	1	0	0	Low	1	0	0	0	Low	0	0	0	0	0	0	0	0	0	0	0	0
SRK046	ANF	Low	1	0	0	1	0	0	0	0	Low	0	0	0	0	0	0	0	0	0	0	0	0
SRK049	ANFQ	Low	2	0	0	2	1	0	0	0	Low	0	0	0	0	0	0	0	0	0	0	0	0
SRK050	ANGA	Low	1	0	0	3	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
SRK051	ANFF	7	3	0	0	Low	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0
SRK052	ANFA	2	1	0	0	Low	0	0	0	0	Low	0	0	0	0	0	Low	0	0	0	0	0	0
SRK053	ANFQ	Low	1	0	0	Low	0	0	0	0	Low	0	0	0	0	0	0	0	0	0	0	0	0
SRK054	ANFQ	Low	2	0	0	2	1	0	0	0	0	0	0	0	0	0	Low	0	0	0	0	0	0
SRK055	ANFQ	2	1	0	1	2	0	0	0	0	Low	0	0	0	0	0	Low	0	0	0	0	0	0
SRK056	ANFF	5	1	0	0	Low	1	0	0	0	Low	0	0	0	0	0	1	0	0	0	0	0	0
SRK057	ANF	7	2	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SRK058	ANF	6	1	0	0	2	1	0	Low	0	Low	0	0	0	0	0	Low	0	0	0	0	0	0
SRK059	ANFA	Low	1	0	0	1	1	0	Low	0	Low	0	0	0	0	0	0	0	0	0	0	0	0
SRK060	ANGA	Low	1	0	0	2	0	0	0	0	2	0	0	0	0	0	Low	0	0	0	0	0	0

Notes: 'Low' indicates concentration was below detection limit.

Table D-8: Calculated Global Abundance Indices (GAI) (cont.)

Sample	Major Unit	Au	Ag	Al	As	B	Ba	Be	Bi	Ca	Cd	Co	Cr	Cu	F	Fe	Hg	K	Mg	Mn	Mo	Na	Ni
SRK061	AZS	3	2	0	1	2	0	0	0	0	0	0	0	0	0	0	Low	0	0	0	1	0	0
SRK062	PPB	3	2	0	0	1	0	0	0	0	0	0	0	0	0	0	Low	0	0	0	0	0	Low
SRK063	MS	Low	1	0	1	3	0	0	2	0	Low	0	0	0	0	0	Low	0	0	0	0	0	0
SRK064	ANFF	Low	1	0	0	2	1	0	0	0	1	0	0	0	0	0	Low	0	0	0	0	0	0
SRK066	ANA	Low	1	0	0	2	0	0	0	0	Low	0	0	0	0	0	Low	0	1	0	0	0	0
SRK067	AZC	5	1	0	0	1	1	0	0	0	Low	0	0	0	0	0	Low	0	0	0	0	0	0
SRK068	ANGA	Low	1	0	0	Low	0	0	0	0	1	0	0	0	0	0	Low	0	0	0	0	0	0
SRK069	ANGA	Low	1	0	0	1	0	0	0	0	0	0	0	0	0	0	Low	0	0	0	0	0	0
SRK070	ANFF	9	3	0	0	Low	0	0	0	0	0	0	0	0	0	0	Low	0	0	0	2	0	0
SRK071	ANG	Low	1	0	1	1	0	0	0	0	0	0	0	0	0	0	Low	0	0	0	0	0	0
SRK074	ANC RT	4	2	0	3	Low	0	0	0	0	2	0	0	0	0	0	Low	0	0	0	0	0	0
SRK075	ANC RT	2	3	0	0	Low	0	0	1	0	1	0	0	0	0	0	Low	0	0	0	1	0	0
SRK076	ANF	2	4	0	0	3	0	0	0	0	4	0	0	0	0	0	Low	0	0	0	1	0	0
SRK077	ANF	7	2	0	0	Low	0	0	2	0	0	0	0	0	0	0	Low	0	0	0	0	0	0
SRK078	ANF	3	1	0	0	Low	0	0	0	0	0	0	0	0	0	0	Low	0	0	0	0	0	0
SRK079	ANF	3	2	0	0	Low	0	0	0	0	0	0	0	0	0	0	Low	0	0	0	3	0	0
SRK080	AZB	5	2	0	0	Low	1	0	0	0	0	0	0	0	0	0	Low	0	0	0	0	0	0
SRK081	ALCY	5	3	0	0	Low	0	0	0	0	Low	0	0	0	0	0	0	0	0	0	0	0	0
SRK082	ANC RT	Low	1	0	0	Low	0	0	0	0	0	0	0	0	0	0	Low	0	0	0	1	0	0
SRK083	ANFQ	3	1	0	0	2	1	0	0	0	Low	0	0	0	0	0	Low	0	0	0	0	0	0
SRK084	ANFQ	6	2	0	0	Low	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SRK085	ANFQ	2	1	0	4	Low	0	0	0	0	Low	0	0	0	0	0	Low	0	0	0	0	0	0
SRK086	AN	2	1	0	3	Low	1	0	0	0	0	0	0	0	0	0	Low	0	0	0	0	0	0
SRK087	MS	Low	1	0	1	2	0	0	1	0	Low	0	0	0	0	0	Low	0	0	0	0	0	0
SRK088	AX	2	2	0	6	2	0	0	0	0	1	0	0	0	0	0	Low	0	0	0	0	0	0
SRK089	TL	3	1	0	1	2	0	0	1	0	Low	0	0	0	0	0	Low	0	0	0	0	0	0
SRK090	ANFF	7	2	0	0	Low	1	0	0	0	0	0	0	0	0	0	Low	0	0	0	0	0	0

Notes: 'Low' indicates concentration was below detection limit.

Table D-8: Calculated Global Abundance Indices (GAI) (cont.)

Sample	Major Unit	Au	Ag	Al	As	B	Ba	Be	Bi	Ca	Cd	Co	Cr	Cu	F	Fe	Hg	K	Mg	Mn	Mo	Na	Ni
SRK091	ANGA	2	1	0	0	Low	0	0	0	0	1	0	1	0	0	0	Low	0	0	0	0	0	0
SRK092	ANFA	2	1	0	0	Low	0	0	0	0	Low	0	0	0	0	0	Low	0	0	0	0	0	0
SRK093	QLSD	4	1	0	1	Low	0	0	0	0	Low	0	0	0	0	0	Low	0	0	0	0	0	0
SRK094	QLSD	2	1	0	0	Low	0	0	0	0	Low	0	0	0	0	0	Low	0	0	0	0	0	0
SRK095	ANF	4	2	0	2	1	0	0	0	0	0	0	0	0	0	0	Low	0	0	0	1	0	0
SRK096	ANFF	7	2	0	0	Low	1	0	0	0	Low	0	0	0	0	0	Low	0	0	0	0	0	0
SRK1B001	ALCY	5	1	0	2	Low	0	0	0	0	0	0	0	0	0	0	Low	0	0	0	0	0	0
SRK1B001	ALCY	6	1	0	2	Low	0	0	0	0	0	0	0	0	0	0	Low	0	0	0	0	0	0
SRK1B002	TL	3	Low	0	2	2	0	0	0	0	Low	0	0	0	0	0	Low	0	0	0	0	0	0
SRK1B003	ALCY	6	1	0	2	Low	2	0	2	0	Low	0	0	0	0	0	Low	0	0	0	1	0	0
SRK1B004	ANGQ	Low	0	0	0	2	0	0	0	0	0	0	0	0	0	0	Low	0	0	0	0	0	0
SRK1B005	ANGA	2	0	0	0	Low	0	0	0	0	0	0	1	0	0	0	Low	0	Low	0	0	0	0
SRK1B006	ANFF	5	1	0	0	2	2	0	0	0	Low	0	0	0	0	0	Low	0	0	0	0	0	0
SRK1B007	ANC RT	Low	2	0	3	2	0	0	1	0	1	0	0	1	0	0	Low	0	0	0	0	0	0
SRK1B008	ANFF	2	1	0	0	Low	1	0	0	0	Low	0	0	0	0	0	Low	0	0	0	0	0	0
SRK1B009	ANFF	9	2	0	0	Low	0	0	2	0	Low	0	0	0	0	0	0	Low	0	0	1	0	0
SRK1B010	ANFQ	6	2	0	1	1	0	0	0	0	0	0	0	0	0	0	Low	0	0	0	0	0	0
SRK1B011	AZ	3	1	0	2	2	0	0	0	0	0	0	0	0	0	0	Low	0	0	0	0	0	0
SRK1B012	TL	4	0	0	2	2	1	0	1	0	Low	0	0	0	0	0	Low	0	0	0	0	0	0
SRK1B013	APP	3	0	0	0	2	1	0	0	0	0	0	0	0	0	0	Low	0	0	0	0	0	0
SRK1B015	ANFQ	Low	0	0	0	2	0	0	0	0	0	0	0	0	0	0	Low	0	0	0	0	0	0
SRK1B017	ANFQ	2	0	0	0	Low	1	0	0	0	Low	0	0	0	0	0	Low	0	0	0	0	0	0
SRK1B018	ANFQ	2	0	0	0	Low	0	0	0	0	Low	0	0	0	0	0	Low	0	0	0	0	0	0
SRK1B019	ANGQ	5	0	0	1	Low	0	0	0	0	0	0	0	0	0	0	Low	0	0	0	0	0	0
SRK1B022	TL	2	Low	0	2	2	0	0	1	0	Low	0	0	0	0	0	Low	0	0	0	0	0	0
SRK1B025	AZ	Low	2	0	1	2	0	0	0	0	2	0	0	0	0	0	Low	0	0	0	0	0	0
SRK1B027	TL	5	1	0	2	2	0	0	2	0	Low	0	0	0	0	0	Low	0	0	0	0	0	0
SRK1B028	ANFQ	2	Low	0	0	Low	0	0	0	0	Low	0	0	0	0	0	Low	0	0	0	0	0	0

Notes: 'Low' indicates concentration was below detection limit.

Table D-8 Calculated Global Abundance Indices (GAI) (cont.)

Sample	Major Unit	Au	Ag	Al	As	B	Ba	Be	Bi	Ca	Cd	Co	Cr	Cu	F	Fe	Hg	K	Mg	Mn	Mo	Na	Ni
SRK1B029	ANC RT	4	3	0	4	2	0	0	2	0	0	1	0	2	0	0	Low	0	0	0	1	0	0
SRK1B030	ANFQ	5	1	0	2	Low	0	0	0	0	0	0	0	0	0	0	Low	0	0	0	0	0	0
SRK1B033	ANFF	8	2	0	0	Low	0	0	0	0	1	0	0	0	0	0	Low	0	0	0	0	0	0
SRK1B035	TL	4	0	0	2	2	1	0	0	0	Low	0	0	0	0	0	Low	0	0	0	0	0	0
SRK1B036	ALCY	Low	0	0	0	Low	0	0	0	0	0	0	Low	0	0	0	Low	0	0	0	1	0	0
SRK1B037	ANFF	3	0	0	0	Low	0	0	0	0	0	0	0	0	0	0	Low	0	0	0	0	0	0
SRK1B038	APP	Low	1	0	0	2	0	0	0	0	Low	0	0	0	0	0	Low	0	0	0	0	0	0
SRK1B039	AZ	5	2	0	1	2	0	0	1	0	1	0	0	0	0	0	Low	0	0	0	0	0	0
SRK1B041	ANFF	7	2	0	2	Low	0	0	1	0	2	0	0	0	0	0	0	0	0	0	1	0	0
SRK1B041	ANFF	8	2	0	2	Low	0	0	1	0	0	0	0	0	0	0	Low	0	0	0	1	0	0
SRK1B042	ALCY	2	0	0	0	Low	0	0	0	0	2	1	0	0	0	0	Low	0	0	0	0	0	0
SRK1B043	AZ	Low	0	0	0	4	0	0	0	0	0	0	0	0	0	0	Low	0	0	0	0	0	0
SRK1B044	ALCY	4	1	0	2	2	1	0	3	0	Low	0	0	0	0	0	Low	0	0	0	1	0	0
SRK1B045	ANGA	3	1	0	0	2	0	0	0	0	0	0	0	0	0	0	Low	0	0	0	1	0	0
SRK1B046	APP	Low	Low	0	0	3	0	0	0	0	0	0	0	0	0	0	Low	0	0	0	0	0	0
SRK1B051	ANFF	9	2	0	2	Low	0	0	2	0	0	0	0	0	0	0	Low	0	0	0	2	0	0
SRK1B052	AZ	2	1	0	1	2	0	0	0	0	0	0	0	0	0	0	Low	0	0	0	0	0	0
SRK1B053	AZC	Low	1	0	1	3	0	0	0	0	0	0	0	0	0	0	Low	0	0	0	0	0	0
SRK1B061	ANC RT	6	3	0	1	Low	0	0	1	0	3	0	0	1	0	0	Low	0	0	0	1	0	0
SRK1B061	ANC RT	6	3	0	1	Low	0	0	1	0	3	0	0	1	0	0	Low	0	0	0	2	0	0
SRK1B062	ANC RT	7	2	0	2	Low	0	0	0	0	3	0	0	0	0	0	Low	0	0	0	1	0	0
SRK1B063	ANGA	2	1	0	0	4	0	0	0	0	2	0	0	0	0	0	Low	0	0	0	0	0	0
SRK1B064	ANGQ	Low	0	0	0	1	0	0	0	0	0	0	0	0	0	0	Low	0	0	0	0	0	0
SRK1B065	ANGA	Low	Low	0	0	Low	0	0	Low	0	0	0	0	0	0	0	Low	0	0	0	0	0	0
SRK1B066	AX	5	2	0	5	Low	0	0	1	0	2	1	0	2	0	0	Low	0	0	0	1	0	1

Notes: ‘Low’ indicates concentration was below detection limit.

Table D-8: Calculated Global Abundance Indices (GAI) (cont.)

Sample	Major Unit	P	Pb	S	Sb	Se	Si	Sn	Sr	Th	Tl	U	V	Zn
SRK003	ANC RT	0	0	6	0	3	0	0	0	0	0	0	0	0
SRK004	ANC RT	0	0	6	0	4	0	0	0	0	0	0	0	0
SRK005	ANFA	0	0	2	0	0	0	0	0	0	0	0	0	0
SRK006	ANG	0	2	2	0	1	0	0	0	0	0	0	0	0
SRK009	ANGA	0	0	2	Low	2	0	0	0	0	0	0	0	0
SRK010	ANF	0	0	3	0	0	0	0	0	0	0	0	0	0
SRK011	ANGA	0	0	0	Low	1	0	0	0	0	0	0	0	0
SRK012	ANC RT	0	4	6	0	5	0	0	0	0	0	0	0	3
SRK013	TL	0	0	0	0	0	0	0	0	0	0	0	0	0
SRK014	TL	0	0	0	0	0	0	0	0	0	0	0	0	0
SRK015	ANGA	0	0	1	Low	1	0	0	0	0	0	0	0	0
SRK016	PPD	0	0	3	0	0	0	0	0	0	0	0	0	0
SRK017	ANFA	0	0	3	0	0	0	0	0	0	0	0	0	0
SRK018	ANFA-ANGA	0	0	2	0	0	0	0	0	0	0	0	0	0
SRK019	ANG	0	0	3	0	0	0	0	0	0	0	0	0	0
SRK020	ANFA	0	0	2	0	0	0	0	0	0	0	0	0	0
SRK021	ANFF	0	0	4	0	2	0	0	0	0	0	0	0	0
SRK022	ANFF	0	0	4	0	2	0	0	0	0	0	0	0	0
SRK023	ANFQ	0	1	2	0	0	0	0	0	0	0	0	0	0
SRK024	TL	0	0	0	0	1	0	0	0	0	0	0	0	0
SRK025	ANC RT	0	Low	4	Low	3	0	0	0	0	0	0	0	0
SRK026	ANC RT	0	0	4	Low	3	0	0	0	0	0	0	0	0
SRK027	ANG	0	0	2	0	2	0	0	0	0	0	0	0	0
SRK028	ANGA	0	0	2	Low	1	0	0	0	0	0	0	0	0
SRK029	ANC RT	0	3	5	0	3	0	0	0	0	0	0	0	3
SRK030	ANGA	0	0	3	Low	1	0	0	0	0	0	0	0	0
SRK031	ANFA	0	0	2	0	0	0	0	0	0	0	0	0	0
SRK032	ANFF	0	0	3	0	0	0	0	0	0	0	0	0	0
SRK033	ANFF	0	0	4	0	2	0	0	0	0	0	0	0	1
SRK034	ANC RT	0	0	1	0	2	0	0	0	0	0	0	0	0
SRK035	ANFF	0	0	4	0	2	0	0	0	0	0	0	0	0
SRK036	ANFF	0	0	3	0	1	0	0	0	0	0	0	0	0
SRK037	AN	0	0	0	0	0	0	0	0	0	0	0	0	0

Notes: 'Low' indicates concentration was below detection limit.

Table D-8: Calculated Global Abundance Indices (GAI) (cont.)

Sample	Major Unit	P	Pb	S	Sb	Se	Si	Sn	Sr	Th	Tl	U	V	Zn
SRK038	ANG	0	0	1	0	1	0	0	0	0	0	0	0	0
SRK039	ANGA	0	0	1	0	0	0	0	0	0	0	0	0	0
SRK040	ANGA	0	0	1	0	0	0	0	0	0	0	0	0	0
SRK041	ANFQ	0	0	4	0	2	0	0	0	0	0	0	0	0
SRK042	ALCY	0	0	1	0	2	0	0	0	0	0	0	0	0
SRK043	PPD	0	0	3	0	0	0	0	0	0	0	0	0	0
SRK044	PPD	0	0	2	0	0	0	0	0	0	0	0	0	0
SRK045	ANFA	0	0	1	0	0	0	0	0	0	0	0	0	0
SRK046	ANF	0	0	1	0	0	0	0	0	0	0	0	0	0
SRK049	ANFQ	0	0	3	0	1	0	0	0	0	0	0	0	0
SRK050	ANGA	0	0	2	0	2	0	0	0	0	0	0	0	0
SRK051	ANFF	0	5	5	0	2	0	0	0	0	0	0	0	1
SRK052	ANFA	0	0	2	0	0	0	0	1	0	0	0	0	0
SRK053	ANFQ	0	0	0	0	0	0	0	0	0	0	0	0	0
SRK054	ANFQ	0	0	5	0	1	0	0	0	0	0	0	0	0
SRK055	ANFQ	0	0	1	0	0	0	0	0	0	0	0	0	0
SRK056	ANFF	0	0	4	0	0	0	0	1	0	0	0	0	0
SRK057	ANF	0	0	3	0	0	0	0	0	0	0	0	0	0
SRK058	ANF	0	0	3	0	0	0	0	0	0	0	0	0	0
SRK059	ANFA	0	0	1	Low	0	0	0	0	0	0	0	0	0
SRK060	ANGA	0	0	3	0	1	0	0	0	0	0	0	0	0
SRK061	AZS	0	0	4	0	2	0	0	0	0	0	0	0	0
SRK062	PPB	0	0	2	0	0	0	0	0	0	0	0	0	0
SRK063	MS	0	0	1	0	4	0	0	0	0	0	0	0	0
SRK064	ANFF	0	0	1	0	0	0	0	0	0	0	0	0	0
SRK066	ANA	0	Low	2	0	1	0	0	0	0	0	0	0	0
SRK067	AZC	0	0	4	0	0	0	0	0	0	0	0	0	0
SRK068	ANGA	0	0	Low	Low	0	0	0	0	0	0	0	0	0
SRK069	ANGA	0	0	2	0	0	0	0	0	0	0	0	0	0
SRK070	ANFF	0	0	5	0	3	0	0	0	0	0	0	0	0
SRK071	ANG	0	0	2	0	0	0	0	0	0	0	0	0	0
SRK074	ANC RT	0	0	6	0	4	0	0	0	0	0	0	0	2
SRK075	ANC RT	0	2	5	0	2	0	0	0	0	0	0	0	1

Notes: 'Low' indicates concentration was below detection limit.

Table D-8: Calculated Global Abundance Indices (GAI) (cont.)

Sample	Major Unit	P	Pb	S	Sb	Se	Si	Sn	Sr	Th	Tl	U	V	Zn
SRK076	ANF	0	4	4	0	1	0	0	0	0	0	0	0	3
SRK077	ANF	0	1	5	1	2	0	0	1	1	0	1	0	0
SRK078	ANF	0	0	4	0	2	0	0	0	0	0	0	0	0
SRK079	ANF	0	1	4	0	0	0	0	0	0	0	0	0	0
SRK080	AZB	1	1	3	0	1	0	0	0	0	0	0	0	0
SRK081	ALCY	0	2	0	2	0	0	0	0	0	0	0	0	0
SRK082	ANC RT	0	0	3	0	Low	0	0	0	0	0	0	0	0
SRK083	ANFQ	0	0	4	0	1	0	0	0	0	0	0	0	0
SRK084	ANFQ	0	0	2	0	1	0	0	0	0	0	0	0	0
SRK085	ANFQ	0	0	2	0	0	0	0	0	0	0	0	0	0
SRK086	AN	0	1	0	0	0	0	0	0	0	0	0	0	0
SRK087	MS	0	0	0	0	3	0	0	0	0	0	0	0	0
SRK088	AX	0	0	5	0	3	0	0	0	0	0	0	0	0
SRK089	TL	0	0	2	0	3	0	0	0	0	0	0	0	0
SRK090	ANFF	1	0	0	0	1	0	0	1	0	0	0	0	0
SRK091	ANGA	0	0	0	Low	0	0	0	0	0	0	0	0	0
SRK092	ANFA	0	0	0	0	0	0	0	0	0	0	0	0	0
SRK093	QLSD	0	0	0	0	2	0	0	0	0	0	0	0	0
SRK094	QLSD	0	0	0	0	0	0	0	0	0	0	0	0	0
SRK095	ANF	0	1	0	0	0	0	0	0	0	0	0	0	0
SRK096	ANFF	0	1	4	0	2	0	0	0	0	0	0	0	0
SRK1B001	ALCY	0	0	0	0	1	0	0	0	0	0	0	0	1
SRK1B001	ALCY	0	0	0	0	1	0	0	0	0	0	0	0	1
SRK1B002	TL	0	0	1	0	3	0	0	0	0	0	0	0	0
SRK1B003	ALCY	0	1	0	3	1	0	0	1	0	0	0	0	0
SRK1B004	ANGQ	0	0	2	0	1	0	0	0	0	0	0	0	0
SRK1B005	ANGA	0	0	1	0	1	0	0	0	0	0	0	0	0
SRK1B006	ANFF	0	0	2	0	1	0	0	0	0	1	0	0	0
SRK1B007	ANC RT	0	0	7	0	4	0	0	0	0	1	0	0	0
SRK1B008	ANFF	0	0	2	0	0	0	0	0	0	0	0	0	0
SRK1B009	ANFF	0	1	5	1	2	0	0	0	0	1	0	0	0
SRK1B010	ANFQ	0	1	4	1	0	0	0	0	0	0	0	0	0
SRK1B011	AZ	0	0	4	0	2	0	0	0	0	0	0	0	0

Notes: 'Low' indicates concentration was below detection limit.

Table D-8: Calculated Global Abundance Indices (GAI) (cont.)

Sample	Major Unit	P	Pb	S	Sb	Se	Si	Sn	Sr	Th	Tl	U	V	Zn
SRK1B012	TL	0	0	0	0	2	0	0	0	0	0	0	0	0
SRK1B013	APP	0	0	3	0	0	0	0	0	0	0	0	0	0
SRK1B015	ANFQ	0	0	4	0	1	0	0	0	0	0	0	0	0
SRK1B017	ANFQ	0	0	3	0	0	0	0	0	0	0	0	0	0
SRK1B018	ANFQ	0	0	1	0	0	0	0	0	0	0	0	0	0
SRK1B019	ANGQ	0	0	0	0	0	0	0	0	0	0	0	0	0
SRK1B022	TL	0	0	1	0	3	0	0	0	0	0	0	0	0
SRK1B025	AZ	0	1	3	0	0	0	0	0	0	0	0	0	1
SRK1B027	TL	0	0	0	1	3	0	0	0	0	0	0	0	0
SRK1B028	ANFQ	0	0	1	0	0	0	0	0	0	0	0	0	0
SRK1B029	ANC RT	0	0	8	0	4	0	0	0	0	0	0	0	0
SRK1B030	ANFQ	0	0	4	0	0	0	0	0	0	0	0	0	0
SRK1B033	ANFF	0	2	4	0	2	0	0	1	1	0	0	0	1
SRK1B035	TL	0	0	0	1	3	0	0	0	0	0	0	0	0
SRK1B036	ALCY	0	0	1	0	1	0	0	0	0	0	0	0	0
SRK1B037	ANFF	0	0	3	0	0	0	0	0	0	0	0	0	0
SRK1B038	APP	0	0	4	0	0	0	0	0	1	0	0	0	0
SRK1B039	AZ	0	1	5	0	2	0	0	0	0	0	0	0	0
SRK1B041	ANFF	1	0	5	1	3	0	0	0	0	0	0	0	0
SRK1B041	ANFF	1	0	5	0	3	0	0	0	0	1	0	0	0
SRK1B042	ALCY	0	0	0	0	1	0	0	0	0	0	0	0	1
SRK1B043	AZ	0	0	2	0	1	0	0	0	0	0	0	0	0
SRK1B044	ALCY	0	1	3	2	3	0	0	0	1	0	0	0	0
SRK1B045	ANGA	0	0	4	0	3	0	0	0	0	0	0	0	0
SRK1B046	APP	0	0	2	0	1	0	0	0	0	0	0	0	0
SRK1B051	ANFF	0	1	5	1	3	0	0	0	0	0	0	0	0
SRK1B052	AZ	0	0	3	0	2	0	0	0	0	0	0	0	0
SRK1B053	AZC	0	0	3	0	2	0	0	0	0	0	0	0	0
SRK1B061	ANC RT	0	0	7	0	5	0	0	0	0	0	0	0	2
SRK1B061	ANC RT	0	0	7	0	5	0	0	0	0	0	0	0	2
SRK1B062	ANC RT	0	1	5	0	3	0	0	0	0	0	0	0	0
SRK1B063	ANGA	0	0	2	0	1	0	0	0	0	0	0	0	1
SRK1B064	ANGQ	0	0	1	0	1	0	0	0	0	0	0	0	0
SRK1B065	ANGA	0	0	1	0	1	0	0	0	0	0	0	0	0
SRK1B066	AX	0	0	6	0	6	0	0	0	0	0	0	0	2

Notes: 'Low' indicates concentration was below detection limit.

Appendix E: Kinetic Test Results

Client: AGA
Project: Tropicana
Project No: AGA001
Test: HC 1
Sample = SRK003

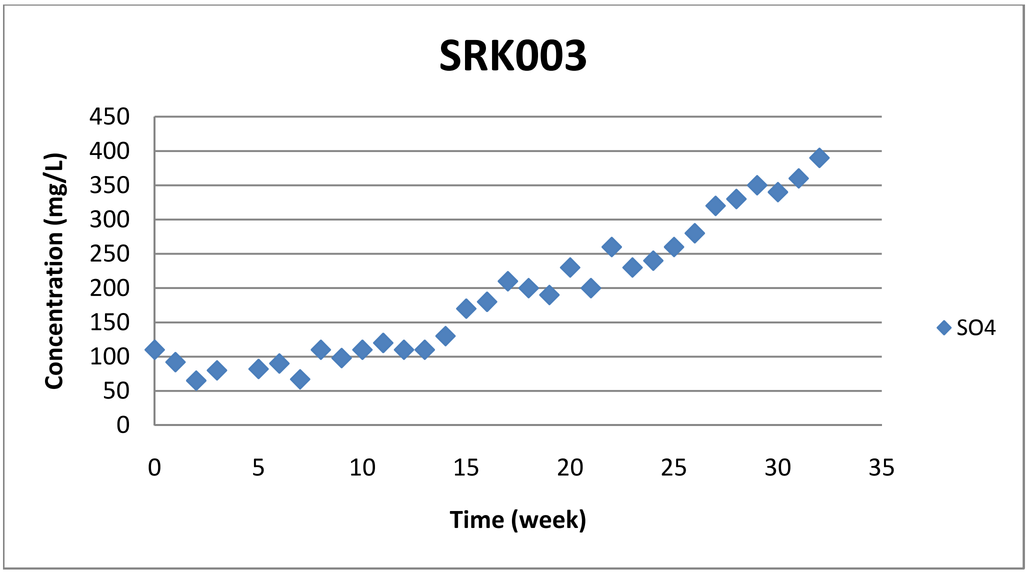
Date	Cycle	Volume mL		pH	ORP	Cond.	Acidity	Acidity	Alkalinity	Sulphate	Chloride	Fluoride	Hardness	Al	Sb	As	Ba	Be	Bi	B
		Input	Output		SHE	umhos/cm	(pH 4.5)	(pH 8.3)					CaCO3							
					mV		mgCaCO3/L	mgCaCO3/L	mgCaCO3/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
LOD		5	5	0.01	1.00	1	0.1	0.1	0.1	1	0.5	0.05	#N/A	0.0002	0.00002	0.00002	0.00002	0.00001	0.000005	0.005
																	0.01			
31/05/2008	0	1000.00	830.00	6.20		610		< 5.00	10	110				< 0.01	0.0008	0.012	0.1866	< 0.0001		
7/06/2008	1	1000.00	860.00	5.40		380		14	6	92				< 0.01	0.0002	0.007	0.1398	< 0.0001		
14/06/2008	2	1000.00	860.00	6.20		260		10	8	65					0					
21/06/2008	3	1000.00	870.00	6.20		280		10	8	80					0					
5/07/2008	5	1000.00	870.00	4.50		270		15	< 5.00	82				0.1	0.0004	0.011	0.1078	0.002		
12/07/2008	6	1000.00	840.00	4.40		270		27	< 5.00	90										
19/07/2008	7	1000.00	860.00	5.00		210		20	7	67				0.15	0.0001	0.005	0.0614	< 0.0001		
26/07/2008	8	1000.00	860.00	4.40		330		48	< 5.00	110										
2/08/2008	9	1000.00	880.00	5.10		300		44	< 5.00	98										
9/08/2008	10	1000.00	880.00	4.10		300		50	< 5.00	110	13			0.51	0.0002	0.014	0.0326	0.003		
16/08/2008	11	1000.00	870.00	3.80		340		480	< 5.00	120										
23/08/2008	12	1000.00	860.00	3.90		350		110	< 5.00	110				0.99	0.0001	0.016	0.0542	0.007		
30/08/2008	13	1000.00	870.00	3.90		320		150	< 5.00	110										
6/09/2008	14	1000.00	880.00	3.60		440		280	< 5.00	130										
13/09/2008	15	1000.00	860.00	3.60		450		330	< 5.00	170	6									
20/09/2008	16	1000.00	880.00	3.70		410		360	< 5.00	180	1			1.52	0.0001	0.012	0.0192	0.004		
27/09/2008	17	1000.00	880.00	3.60		490		160	< 5.00	210	1									
4/10/2008	18	1000.00	880.00	3.40		490		160	< 5.00	200	1									
11/10/2008	19	1000.00	880.00	3.50		440		160	< 5.00	190	1									
18/10/2008	20	1000.00	880.00	3.50		520		180	< 5.00	230	1			2.29	< 0.0001	0.022	0.0213	0.01		
25/10/2008	21	1000.00	880.00	5.20		500		220	< 5.00	200	4									
1/11/2008	22	1000.00	880.00	3.40		640		270	< 5.00	260	3									
8/11/2008	23	1000.00	880.00	3.40		580		240	13	230	6									
15/11/2008	24	1000.00	880.00	3.30		640		250	< 5.00	240	4			2.66	0.0002	0.016	0.0263	0.01		
22/11/2008	25	1000.00	880.00	3.20		740		290	< 5.00	260	3									
29/11/2008	26	1000.00	880.00	3.30		740		230	< 5.00	280	< 1.00									
6/12/2008	27	1000.00	880.00	3.30		800		250	< 5.00	320	4									
13/12/2008	28	1000.00	880.00	3.30		810		280	< 5.00	330	4			3.41	< 0.0001	0.019	0.0198	0.014		
20/12/2008	29	1000.00	880.00	3.30		830		240	< 5.00	350	< 1.00									
27/12/2008	30	1000.00	880.00	3.00		790		290	< 5.00	340	< 1.00									
3/01/2009	31	1000.00	880.00	3.00		830		330	< 5.00	360	< 1.00									
10/01/2009	32	1000.00	880.00	3.20		34		330	< 5.00	390	< 1.00			3.63	0.0001	0.01	0.021	0.01		

Client: AGA
Project: Tropicana
Project No: AGA001
Test: HC 1
Sample = SRK003

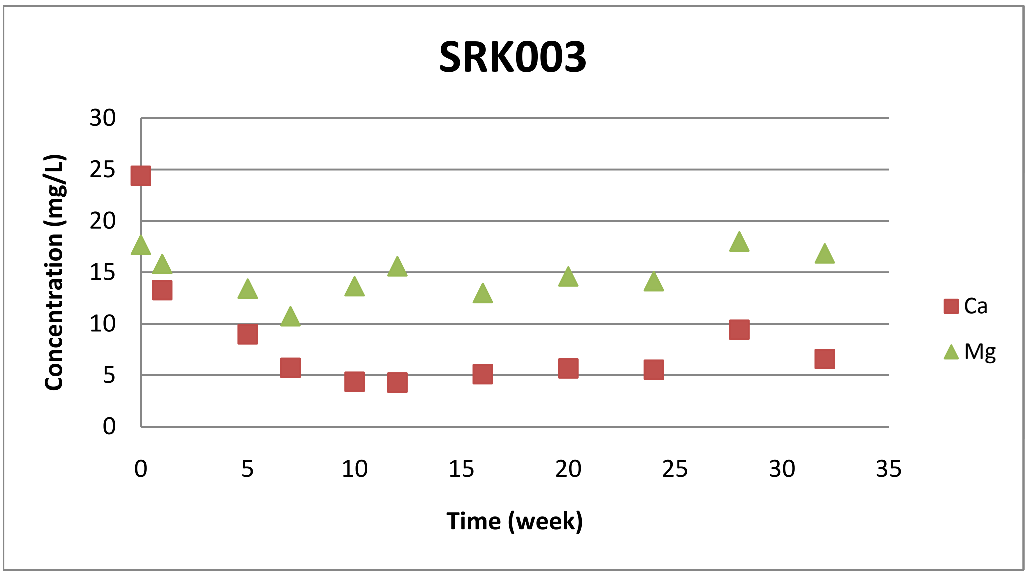
Date	Cycle	Cd	Ca	Cr	Co	Cu	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S
		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
LOD		0.000005	0.05	0.0001	0.000005	0.00005	0.001	0.000005	0.0005	0.05	0.00005	0.01	0.00005	0.00002	0.002	0.05	0.00004	0.1	0.000005	0.05	5E-05	3
31/05/2008	0	0.0196	24.38	< 0.01	0.196	< 0.01	0.38	< 0.005		17.68	1.26	< 0.10	< 0.0005	0.03	< 0.10	3.1	0.01		< 0.0001		1.258	
7/06/2008	1	0.029	13.26	< 0.01	0.129	0.04	0.91	< 0.005		15.81	0.91	< 0.10	< 0.0005	0.02	< 0.10	1.6	0.007		< 0.0001	31.7	0.9017	
14/06/2008	2																					
21/06/2008	3																					
5/07/2008	5	0.0152	8.97	< 0.01	0.226	0.09	1.17	0.029		13.41	1.31	< 0.10	0.0013	0.05	< 0.10	2.5	< 0.005		< 0.0001		0.4704	
12/07/2008	6																					
19/07/2008	7	0.0108	5.71	< 0.01	0.272	0.07	5.65	0.01		10.73	1.29	< 0.10	< 0.0005	0.04	< 0.10	0.7	< 0.005		< 0.0001	7.2	0.2925	
26/07/2008	8																					
2/08/2008	9																					
9/08/2008	10	0.0172	4.35	< 0.01	0.497	0.12	18.77	0.021		13.65	2.56	< 0.10	0.0009	0.1	< 0.10	0.5	< 0.005		< 0.0001	5.3	0.1816	
16/08/2008	11																					
23/08/2008	12	0.0323	4.28	< 0.01	0.607	0.15	32.35	0.009		15.59	3.75	< 0.10	< 0.0005	0.12	< 0.10	0.3	0.007		< 0.0001	6	0.1907	
30/08/2008	13																					
6/09/2008	14																					
13/09/2008	15																					
20/09/2008	16	0.0195	5.1	< 0.01	0.502	0.17	56.33	0.024		12.99	3.73	< 0.10	0.0006	0.15	< 0.10	0.1	0.009		< 0.0001	2	0.1299	
27/09/2008	17																					
4/10/2008	18																					
11/10/2008	19																					
18/10/2008	20	0.031	5.65	< 0.01	0.696	0.19	85.21	0.01		14.6	5.52	< 0.10	0.0013	0.17	< 0.10	0.3	0.013		< 0.0001	1.7	0.1173	
25/10/2008	21																					
1/11/2008	22																					
8/11/2008	23																					
15/11/2008	24	0.0292	5.52	< 0.01	0.705	0.23	88.08	0.017		14.14	5.69	< 0.10	0.0017	0.17	< 0.10	3.7	0.015		< 0.0001	0.9	0.0956	
22/11/2008	25																					
29/11/2008	26																					
6/12/2008	27																					
13/12/2008	28	0.0326	9.42	< 0.01	0.85	0.24	125.97	0.016		18	6.69	< 0.10	0.001	0.2	< 0.10	3.5	0.011		< 0.0001	0.8	0.0987	
20/12/2008	29																					
27/12/2008	30																					
3/01/2009	31																					
10/01/2009	32	0.03	6.57	< 0.01	0.806	0.21	145.92	0.006		16.84	6.19	< 0.10	< 0.0005	0.19	< 0.10	0.3	0.016		0.0001	0.7	0.0717	

Client: AGA
Project: Tropicana
Project No: AGA001
Test: HC 1
Sample = SRK003

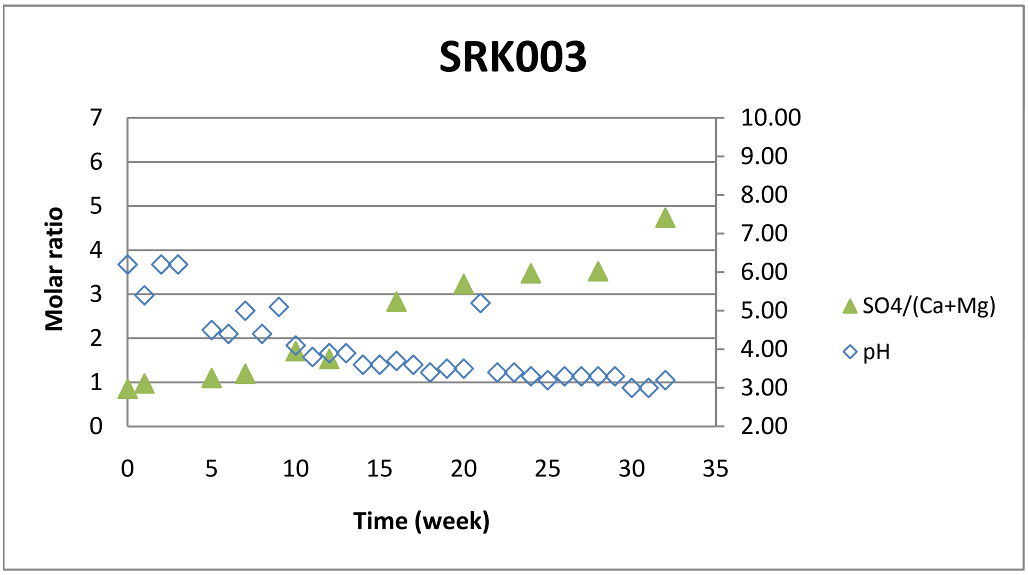
Date	Cycle	Tl	Sn	Ti	U	V	Zn	Zr
		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
LOD		0.000002	0.00001	0.0005	0.000002	0.0002	0.0001	0.0001
31/05/2008	0	0.0003	< 0.001		0.00011	< 0.01	1.15	
7/06/2008	1	0.0002	< 0.001		0.00129	< 0.01	0.88	
14/06/2008	2							
21/06/2008	3							
5/07/2008	5	0.0001	< 0.001		0.00283	< 0.01	0.75	
12/07/2008	6							
19/07/2008	7	0.0002	< 0.001		0.00556	< 0.01	0.64	
26/07/2008	8							
2/08/2008	9							
9/08/2008	10	< 0.0001	< 0.001		0.00888	< 0.01	0.91	
16/08/2008	11							
23/08/2008	12	0.0002	< 0.001		0.01423	< 0.01	1.58	
30/08/2008	13							
6/09/2008	14							
13/09/2008	15							
20/09/2008	16	0.0001	< 0.001		0.01474	< 0.01	1.12	
27/09/2008	17							
4/10/2008	18							
11/10/2008	19							
18/10/2008	20	< 0.0001	< 0.001		0.02027	< 0.01	1.45	
25/10/2008	21							
1/11/2008	22							
8/11/2008	23							
15/11/2008	24	< 0.0001	< 0.001		0.01681	< 0.01	1.2	
22/11/2008	25							
29/11/2008	26							
6/12/2008	27							
13/12/2008	28	< 0.0001	< 0.001		0.01893	< 0.01	1.08	
20/12/2008	29							
27/12/2008	30							
3/01/2009	31							
10/01/2009	32	< 0.0001	< 0.001		0.01483	< 0.01	0.93	



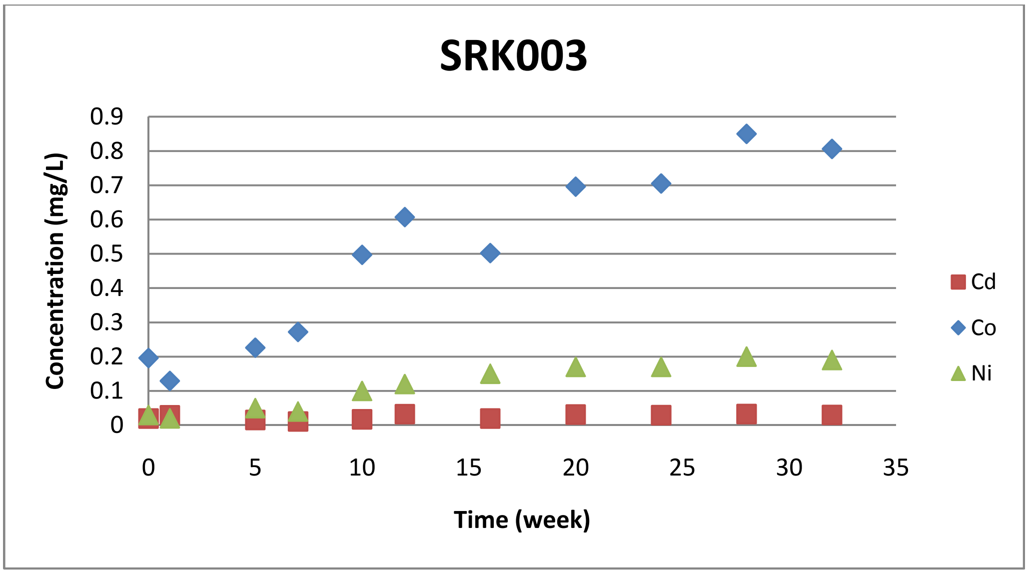
SRK003
Concentration (mg/L)
450
400
350
300
250
200
150
100
50
0
0
5
10
15
20
25
30
35
Time (week)
SO4



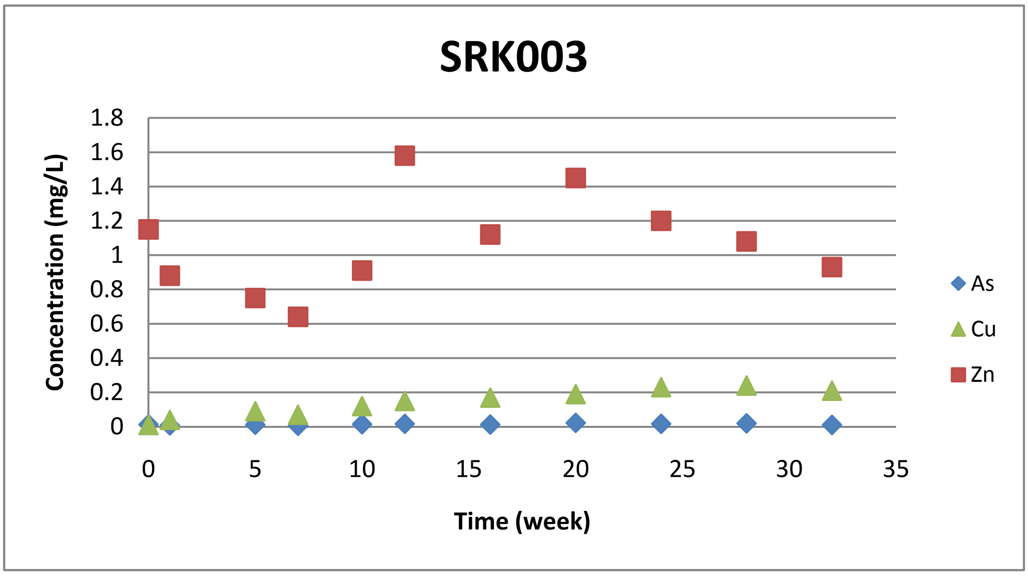
SRK003
Concentration (mg/L)
30
25
20
15
10
5
0
0
5
10
15
20
25
30
35
Time (week)
Ca
Mg



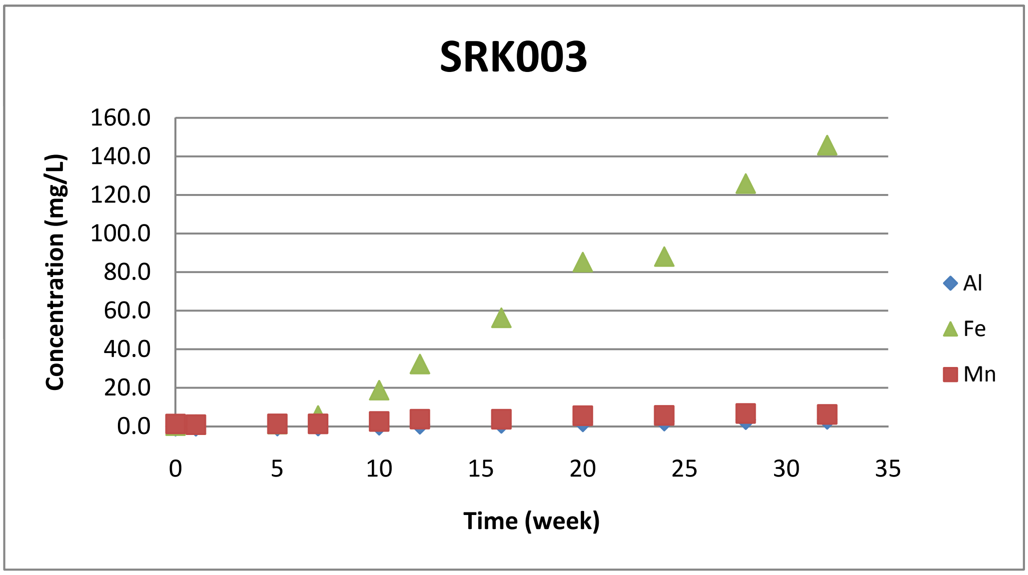
SRK003
Molar ratio
7
6
5
4
3
2
1
0
10.00
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
0
5
10
15
20
25
30
35
Time (week)
SO4/(Ca+Mg)
pH



SRK003
Concentration (mg/L)
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
0
5
10
15
20
25
30
35
Time (week)
Cd
Co
Ni



SRK003
Concentration (mg/L)
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
0
5
10
15
20
25
30
35
Time (week)
As
Cu
Zn



SRK003
Concentration (mg/L)
160.0
140.0
120.0
100.0
80.0
60.0
40.0
20.0
0.0
0
5
10
15
20
25
30
35
Time (week)
Al
Fe
Mn

Client: AGA
Project: Tropicana
Project No: AGA001
Test: HC 1
Sample = SRK006

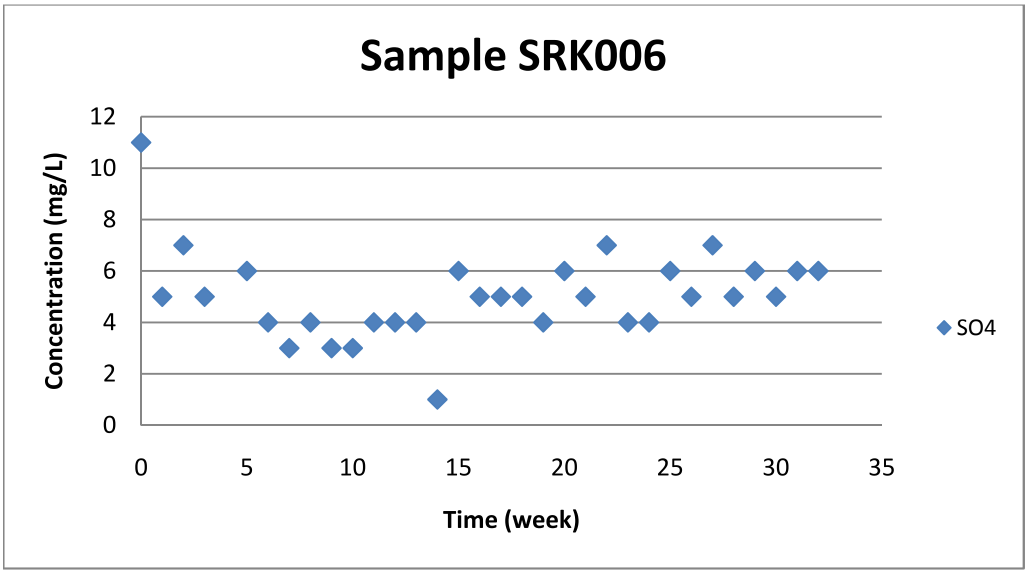
Date	Cycle	Volume mL		pH	ORP	Cond.	Acidity	Acidity	Alkalinity	Sulphate	Chloride	Fluoride	Hardness	Al	Sb	As	Ba	Be	Bi	B
		Input	Output		SHE	umhos/cm	(pH 4.5)	(pH 8.3)					CaCO3							
					mV		mgCaCO3/L	mgCaCO3/L	mgCaCO3/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
LOD		5	5	0.01	1.00	1	0.1	0.1	0.1	1	0.5	0.05	#N/A	0.0002	0.00002	0.00002	0.00002	0.00001	0.000005	0.005
31/05/2008	0	1000.00	820.00	7.10		130		< 5.00	27	11				0.08	0.0055	0.015	0.02	< 0.001		
7/06/2008	1	1000.00	840.00	7.50		90		7	29	5				0.03	0.0059	0.02	0.0273	< 0.001		
14/06/2008	2	1000.00	830.00	7.30		83		7	31	7										
21/06/2008	3	1000.00	840.00	7.20		75		7	30	5										
5/07/2008	5	1000.00	840.00	7.20		89		8	35	6				0.04	0.0048	0.052	0.0408	< 0.001		
12/07/2008	6	1000.00	800.00	6.80		47		5	19	4										
19/07/2008	7	1000.00	850.00	7.20		54		< 5.00	25	3				< 0.01	0.0024	0.034	0.0163	< 0.001		
26/07/2008	8	1000.00	840.00	6.90		50		< 5.00	24	4										
2/08/2008	9	1000.00	840.00	7.00		49		< 5.00	18	3										
9/08/2008	10	1000.00	840.00	6.80		43		< 5.00	17	3	3			0.02	0.0022	0.034	0.0141	< 0.001		
16/08/2008	11	1000.00	850.00	6.90		160		17	14	4										
23/08/2008	12	1000.00	840.00	7.20		52		23	22	4	< 1.00			0.02	0.0029	0.048	0.0156	< 0.001		
30/08/2008	13	1000.00	840.00	6.50		65		10	13	4										
6/09/2008	14	1000.00	850.00	6.70		48		8	16	< 1.00										
13/09/2008	15	1000.00	850.00	6.50		41		6	15	6	1									
20/09/2008	16	1000.00	850.00	6.40		30		< 5.00	12	5	< 1.00			< 0.01	0.0016	0.038	0.0095	< 0.001		
27/09/2008	17	1000.00	860.00	6.80		35		< 5.00	29	5	< 1.00									
4/10/2008	18	1000.00	860.00	6.70		30		5	15	5	< 1.00									
11/10/2008	19	1000.00	860.00	6.70		30		< 5.00	13	4	< 1.00									
18/10/2008	20	1000.00	860.00	6.90		36		< 5.00	17	6	< 1.00			< 0.01	0.0018	0.069	0.0136	< 0.001		
25/10/2008	21	1000.00	860.00	6.80		30		6	10	5	< 1.00									
1/11/2008	22	1000.00	860.00	6.80		37		5	13	7	< 1.00									
8/11/2008	23	1000.00	850.00	6.90		43		5	7	4	4									
15/11/2008	24	1000.00	850.00	6.90		41		5	13	4	3			< 0.01	0.0017	0.05	0.0134	< 0.001		
22/11/2008	25	1000.00	850.00	6.90		34		6	13	6	< 1.00									
29/11/2008	26	1000.00	850.00	6.20		33		< 5.00	15	5	< 1.00									
6/12/2008	27	1000.00	850.00	6.30		33		< 5.00	13	7	1									
13/12/2008	28	1000.00	850.00	6.50		35		< 5.00	13	5	< 1.00			0.02	0.0017	0.063	0.0077	0.001		
20/12/2008	29	1000.00	850.00	6.30		27		< 5.00	9.5	6	< 1.00									
27/12/2008	30	1000.00	850.00	6.20		32		< 5.00	12	5	< 1.00									
3/01/2009	31	1000.00	850.00	6.40		32		< 5.00	12	6	< 1.00									
10/01/2009	32	1000.00	850.00	6.40		26		< 5.00	13	6	< 1.00			< 0.01	0.0017	0.051	0.0102	< 0.001		

Client: AGA
Project: Tropicana
Project No: AGA001
Test: HC 1
Sample = SRK006

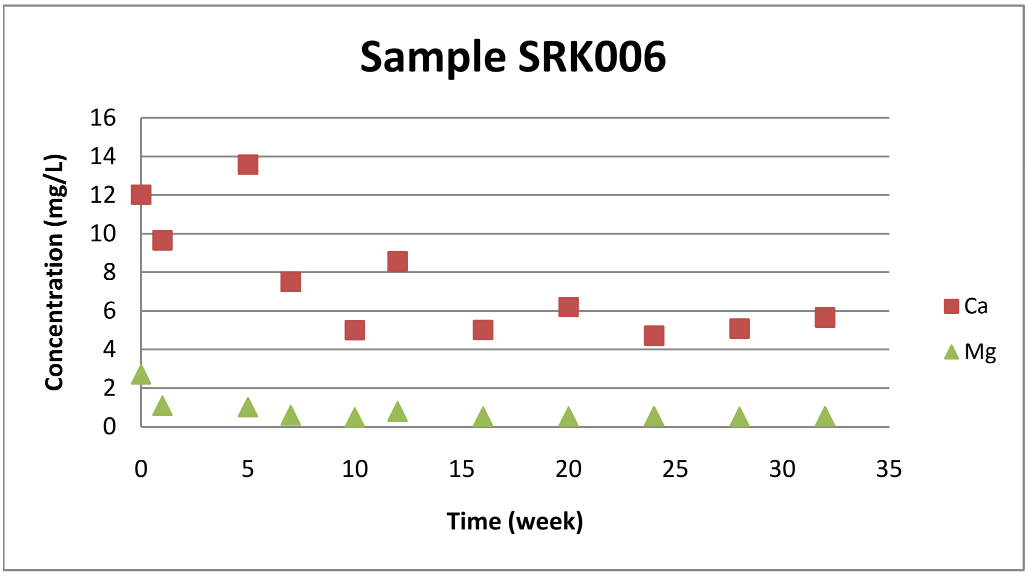
Date	Cycle	Cd	Ca	Cr	Co	Cu	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl
		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
LOD		0.000005	0.05	0.0001	0.000005	0.00005	0.001	0.000005	0.0005	0.05	0.00005	0.01	0.00005	0.00002	0.002	0.05	0.00004	0.1	0.000005	0.05	5E-05	3	0.000002
31/05/2008	0	0.0015	12.02	< 0.01	0.003	< 0.01	< 0.01	< 0.005		2.71	0.02	< 0.10	0.0022	< 0.01	< 0.10	4.3	0.006		< 0.0001		0.2532		0.0001
7/06/2008	1	< 0.0002	9.66	< 0.01	0.001	< 0.01	< 0.01	< 0.005		1.09	0.1	0.1	0.0019	< 0.01	< 0.10	1.7	0.005		< 0.0001		0.1819		0.0001
14/06/2008	2																						
21/06/2008	3																						
5/07/2008	5	< 0.0002	13.58	< 0.01	0.001	< 0.01	< 0.01	< 0.005		1.01	0.19	< 0.10	0.0014	< 0.01	< 0.10	1.6	< 0.005		< 0.0001	2.8	0.166		< 0.0001
12/07/2008	6																						
19/07/2008	7	< 0.0002	7.5	< 0.01	0.002	< 0.01	< 0.01	0.012		0.59	0.12	< 0.10	0.0006	< 0.01	< 0.10	0.8	< 0.005		< 0.0001		0.0833		0.0001
26/07/2008	8																						
2/08/2008	9																						
9/08/2008	10	< 0.0002	5	< 0.01	0.002	< 0.01	0.03	< 0.005		0.48	0.08	< 0.10	0.0008	< 0.01	< 0.10	1	0.005		< 0.0001	1	0.0592		0.0001
16/08/2008	11																						
23/08/2008	12	< 0.0002	8.56	< 0.01	0.001	< 0.01	0.14	< 0.005		0.79	0.15	< 0.10	0.0007	< 0.01	< 0.10	0.7	0.009		< 0.0001	1	0.0749		< 0.0001
30/08/2008	13																						
6/09/2008	14																						
13/09/2008	15																						
20/09/2008	16	< 0.0002	5.01	< 0.01	0.001	< 0.01	< 0.01	< 0.005		0.52	0.06	< 0.10	< 0.001	< 0.01	< 0.10	0.6	< 0.005		< 0.0001	0.6	0.0636		< 0.0001
27/09/2008	17																						
4/10/2008	18																						
11/10/2008	19																						
18/10/2008	20	0.0006	6.2	< 0.01	0.002	< 0.01	0.05	< 0.005		0.52	0.08	< 0.10	0.0007	< 0.01	< 0.10	0.7	0.01		< 0.0001	0.6	0.0763		< 0.0001
25/10/2008	21																						
1/11/2008	22																						
8/11/2008	23																						
15/11/2008	24	0.0006	4.71	< 0.01	0.002	< 0.01	< 0.01	< 0.005		0.55	0.08	< 0.10	0.002	< 0.01	< 0.10	3.9	0.005		0.0001	0.8	0.0583		< 0.0001
22/11/2008	25																						
29/11/2008	26																						
6/12/2008	27																						
13/12/2008	28	0.0002	5.08	< 0.01	0.001	< 0.01	< 0.01	< 0.005		0.51	0.05	< 0.10	< 0.0005	< 0.01	< 0.10	0.7	< 0.005		< 0.0001	0.8	0.0545		< 0.0001
20/12/2008	29																						
27/12/2008	30																						
3/01/2009	31																						
10/01/2009	32	< 0.0002	5.66	< 0.01	0.001	< 0.01	< 0.01	< 0.005		0.54	0.07	< 0.10	0.0007	< 0.01	< 0.10	0.7	< 0.005		< 0.0001	0.9	0.0598		< 0.0001

Client: AGA
Project: Tropicana
Project No: AGA001
Test: HC 1
Sample = SRK006

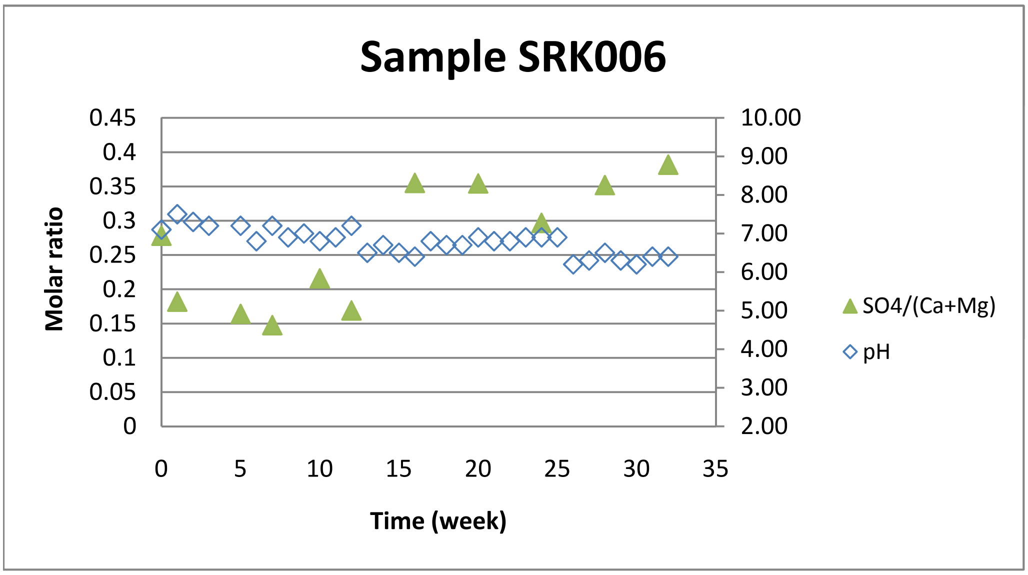
Date	Cycle	Sn	Ti	U	V	Zn	Zr
		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
LOD		0.00001	0.0005	0.000002	0.0002	0.0001	0.0001
31/05/2008	0	0.001		< 0.00005	< 0.01	< 0.01	
7/06/2008	1	< 0.001		0.00007	< 0.01	< 0.01	
14/06/2008	2						
21/06/2008	3						
5/07/2008	5	< 0.001		0.00022	< 0.01	0.02	
12/07/2008	6						
19/07/2008	7	0.006		0.00013	< 0.01	0.01	
26/07/2008	8						
2/08/2008	9						
9/08/2008	10	< 0.001		0.00011	< 0.01	0.01	
16/08/2008	11						
23/08/2008	12	< 0.001		0.00016	< 0.01	0.01	
30/08/2008	13						
6/09/2008	14						
13/09/2008	15						
20/09/2008	16	< 0.001		0.00009	< 0.01	0.01	
27/09/2008	17						
4/10/2008	18						
11/10/2008	19						
18/10/2008	20	< 0.001		0.00011	< 0.01	0.01	
25/10/2008	21						
1/11/2008	22						
8/11/2008	23						
15/11/2008	24	< 0.001		0.00008	< 0.01	0.02	
22/11/2008	25						
29/11/2008	26						
6/12/2008	27						
13/12/2008	28	< 0.001		0.00008	< 0.01	0.01	
20/12/2008	29						
27/12/2008	30						
3/01/2009	31						
10/01/2009	32	< 0.001		0.00009	< 0.01	0.03	



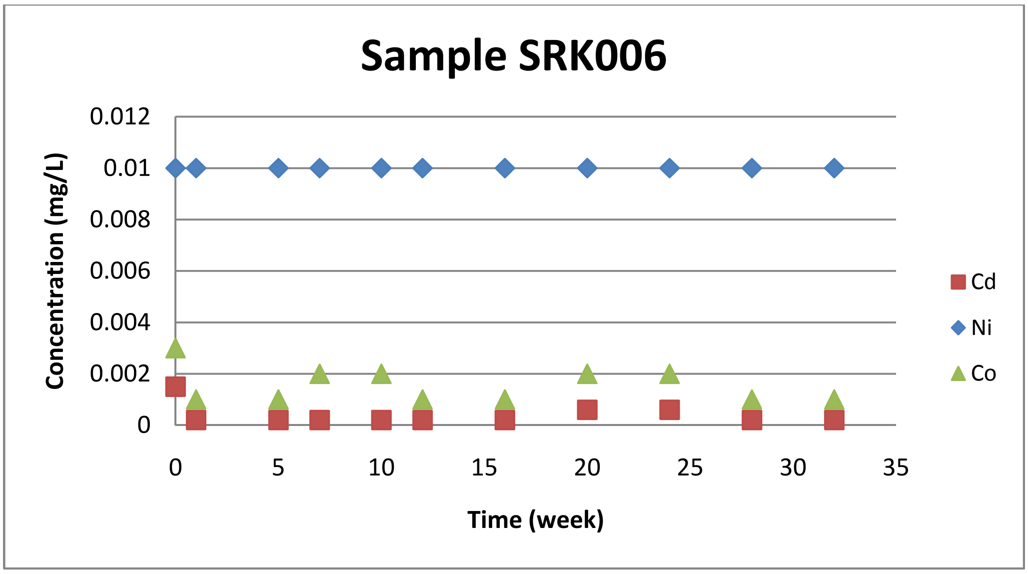
Sample SRK006
Concentration (mg/L)
12
10
8
6
4
2
0
0
5
10
15
20
25
30
35
Time (week)
SO4

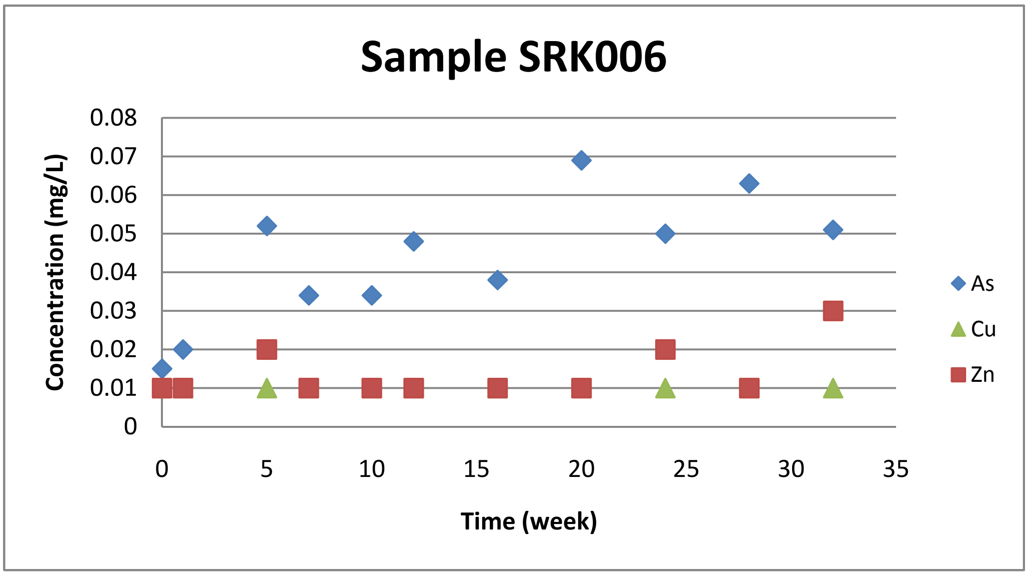


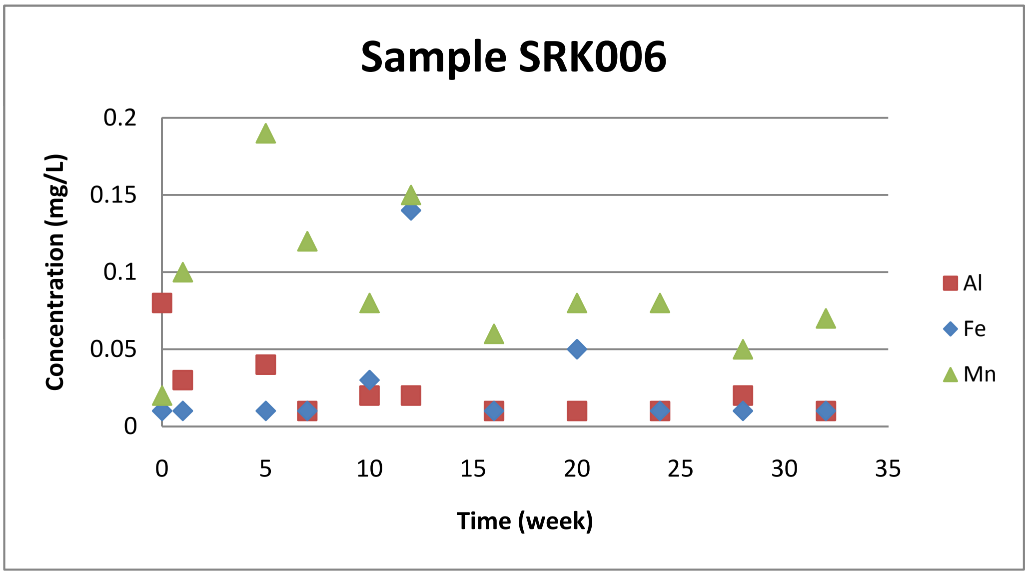
Sample SRK006
Concentration (mg/L)
16
14
12
10
8
6
4
2
0
0
5
10
15
20
25
30
35
Time (week)
Ca
Mg



Sample SRK006
Molar ratio
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
10.00
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
0
5
10
15
20
25
30
35
Time (week)
SO4/(Ca+Mg)
pH


Sample SRK006
Concentration (mg/L)
0.012
0.01
0.008
0.006
0.004
0.002
0
0
5
10
15
20
25
30
35
Time (week)
Cd
Ni
Co


Sample SRK006
Concentration (mg/L)
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
0
5
10
15
20
25
30
35
Time (week)
As
Cu
Zn


Sample SRK006
Concentration (mg/L)
0.2
0.15
0.1
0.05
0
0
5
10
15
20
25
30
35
Time (week)
Al
Fe
Mn

Client: AGA
Project: Tropicana
Project No: AGA001
Test: HC 1
Sample = SRK033

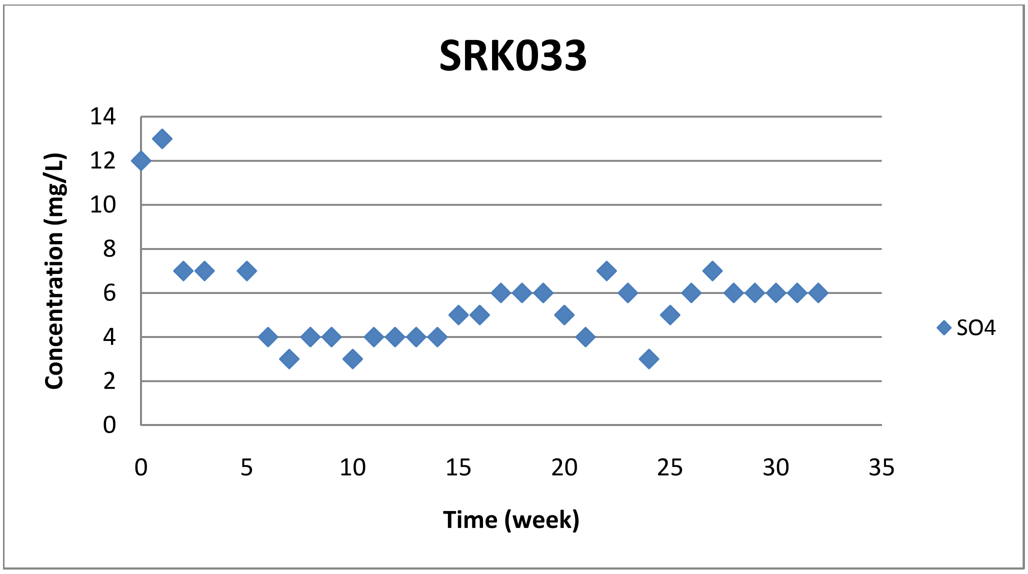
Date	Cycle	Volume mL		pH	ORP	Cond.	Acidity	Acidity	Alkalinity	Sulphate	Chloride	Fluoride	Hardness	Al	Sb	As	Ba	Be	Bi	B
		Input	Output		SHE	umhos/cm	(pH 4.5)	(pH 8.3)					CaCO3							
					mV		mgCaCO3/L	mgCaCO3/L	mgCaCO3/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
LOD		5	5	0.01	1.00	1	0.1	0.1	0.1	1	0.5	0.05	#N/A	0.0002	0.00002	0.00002	0.00002	0.00001	0.000005	0.005
31/05/2008	0	1000.00	780.00	7.10		170		< 5.0	21	12				0.05	0.0035	0.019	0.0656	< 0.001		
7/06/2008	1	1000.00	840.00	7.10		97		9	18	13				< 0.01	0.0018	0.007	0.0625	< 0.001		
14/06/2008	2	1000.00	850.00	6.80		72		7	16	7										
21/06/2008	3	1000.00	850.00	6.80		72		5	18	7										
5/07/2008	5	1000.00	850.00	6.70		62		8	15	7				0.04	0.0013	0.012	0.061	< 0.001		
12/07/2008	6	1000.00	820.00	6.40		37		7	9	4										
19/07/2008	7	1000.00	850.00	6.80		37		< 5.0	12	3				< 0.01	0.0008	0.009	0.0334	< 0.001		
26/07/2008	8	1000.00	860.00	6.60		36		< 5.0	13	4										
2/08/2008	9	1000.00	850.00	6.80		37		< 5.0	13	4										
9/08/2008	10	1000.00	850.00	6.50		38		< 5.0	10	3	2			0.02	0.0007	0.013	0.0253	< 0.001		
16/08/2008	11	1000.00	860.00	6.60		47		18	10	4										
23/08/2008	12	1000.00	850.00	6.60		27		19	10	4	2			0.32	0.0007	0.009	0.0304	< 0.001		
30/08/2008	13	1000.00	840.00	6.30		55		8	7	4										
6/09/2008	14	1000.00	850.00	6.40		35		7	7	4										
13/09/2008	15	1000.00	850.00	6.30		29		5	7	5	2									
20/09/2008	16	1000.00	860.00	6.20		28		5	7	5	1			< 0.01	0.0005	0.006	0.0266	< 0.001		
27/09/2008	17	1000.00	860.00	6.60		28		< 5.0	7	6	2									
4/10/2008	18	1000.00	860.00	6.50		24		< 5.0	7	6	2									
11/10/2008	19	1000.00	860.00	6.40		25		< 5.0	7	6	1									
18/10/2008	20	1000.00	860.00	6.50		25		< 5.0	7	5	2			< 0.01	0.0005	0.009	0.0279	< 0.001		
25/10/2008	21	1000.00	860.00	6.50		21		< 5.0	7	4	1									
1/11/2008	22	1000.00	860.00	6.60		31		6	7	7	2									
8/11/2008	23	1000.00	860.00	6.70		47		< 5.0	7	6	7									
15/11/2008	24	1000.00	860.00	6.70		26		5	7	3	1			< 0.01	0.0007	0.008	0.0259	< 0.001		
22/11/2008	25	1000.00	860.00	6.70		28		5	7	5	1									
29/11/2008	26	1000.00	860.00	6.30		27		5	7	6	2									
6/12/2008	27	1000.00	860.00	6.50		29		5	7	7	2									
13/12/2008	28	1000.00	860.00	6.50		39		< 5.0	7	6	4			0.02	0.0006	0.009	0.0311	0.002		
20/12/2008	29	1000.00	860.00	6.40		25		< 5.0	7	6	1									
27/12/2008	30	1000.00	860.00	6.10		26		< 5.0	6	6	1									
3/01/2009	31	1000.00	860.00	6.20		25		< 5.0	7	6	1									
10/01/2009	32	1000.00	860.00	6.30		26		< 5.0	7	6	< 1.0			< 0.01	0.0006	0.005	0.0255	< 0.001		

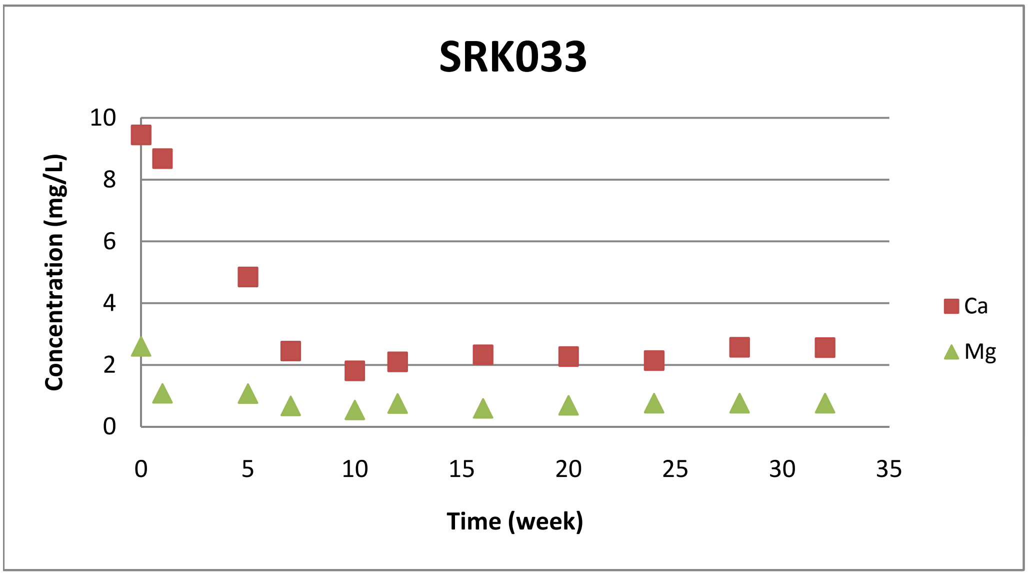
Client: AGA
Project: Tropicana
Project No: AGA001
Test: HC 1
Sample = SRK033

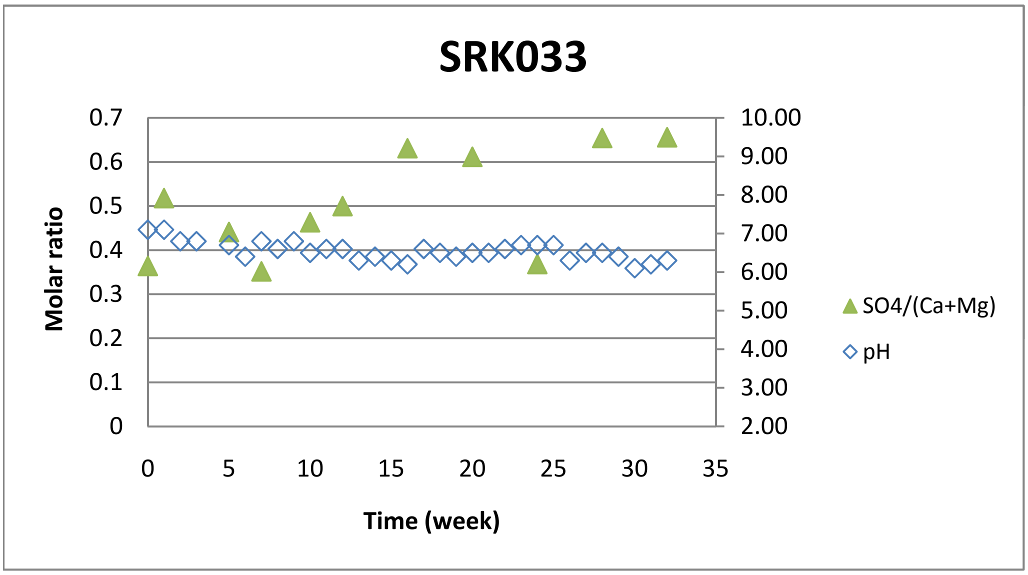
Date	Cycle	Cd	Ca	Cr	Co	Cu	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl
		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
LOD		0.000005	0.05	0.0001	0.000005	0.00005	0.001	0.000005	0.0005	0.05	0.00005	0.01	0.00005	0.00002	0.002	0.05	0.00004	0.1	0.000005	0.05	5E-05	3	0.000002
31/05/2008	0	0.0012	9.45	< 0.01	0.003	< 0.01	< 0.01	< 0.005		2.6	0.02	< 0.1	0.0374	< 0.01	< 0.1	8.9	0.013		< 0.0001		1.9823		0.0002
7/06/2008	1	0.0005	8.68	< 0.01	0.001	< 0.01	< 0.01	< 0.005		1.08	0.07	0.1	0.039	< 0.01	< 0.1	2.7	< 0.005		< 0.0001		3.0828		0.0002
14/06/2008	2																						
21/06/2008	3																						
5/07/2008	5	0.0002	4.85	< 0.01	< 0.001	< 0.01	< 0.01	< 0.005		1.07	0.05	< 0.1	0.0235	< 0.01	< 0.100	2.2	< 0.005		0.0001		1.5043		0.0002
12/07/2008	6																						
19/07/2008	7	< 0.0002	2.45	< 0.01	0.001	< 0.01	< 0.01	< 0.005		0.67	0.03	< 0.1	0.0154	< 0.01	< 0.1	1.3	< 0.005		< 0.0001		0.8039		0.0002
26/07/2008	8																						
2/08/2008	9																						
9/08/2008	10	0.0002	1.81	< 0.01	< 0.001	< 0.01	< 0.01	< 0.005		0.54	0.02	< 0.1	0.0161	< 0.01	< 0.1	1.3	< 0.005		< 0.0001	1.8	0.6226		0.0001
16/08/2008	11																						
23/08/2008	12	< 0.0002	2.1	0.01	< 0.001	0.01	0.8	< 0.005		0.75	0.03	< 0.1	0.0167	0.01	< 0.1	1.2	< 0.005		< 0.0001	1.4	0.5807		0.0002
30/08/2008	13																						
6/09/2008	14																						
13/09/2008	15																						
20/09/2008	16	< 0.0002	2.33	< 0.01	< 0.001	< 0.01	< 0.01	< 0.005		0.59	0.02	< 0.1	0.016	< 0.01	< 0.1	1.3	< 0.005		< 0.0001	1.1	0.7444		0.0001
27/09/2008	17																						
4/10/2008	18																						
11/10/2008	19																						
18/10/2008	20	< 0.0002	2.27	< 0.01	< 0.001	< 0.01	< 0.01	< 0.005		0.69	0.02	< 0.1	0.0203	< 0.01	< 0.1	1.1	0.005		< 0.0001	1.1	0.7381		< 0.0001
25/10/2008	21																						
1/11/2008	22																						
8/11/2008	23																						
15/11/2008	24	0.0007	2.14	< 0.01	< 0.001	< 0.01	< 0.01	< 0.005		0.76	0.02	< 0.1	0.0217	< 0.01	< 0.1	1.2	< 0.005		< 0.0001	1	0.6837		< 0.0001
22/11/2008	25																						
29/11/2008	26																						
6/12/2008	27																						
13/12/2008	28	0.0003	2.57	< 0.01	0.001	< 0.01	< 0.01	0.009		0.76	0.01	< 0.1	0.0234	< 0.01	< 0.1	5.1	< 0.005		0.0004	1.2	0.5854		< 0.0001
20/12/2008	29																						
27/12/2008	30																						
3/01/2009	31																						
10/01/2009	32	< 0.0002	2.56	< 0.01	< 0.001	< 0.01	< 0.01	< 0.005		0.76	0.02	< 0.1	0.0242	< 0.01	< 0.1	1.3	< 0.005		< 0.0001	1.1	0.5506		0.0001

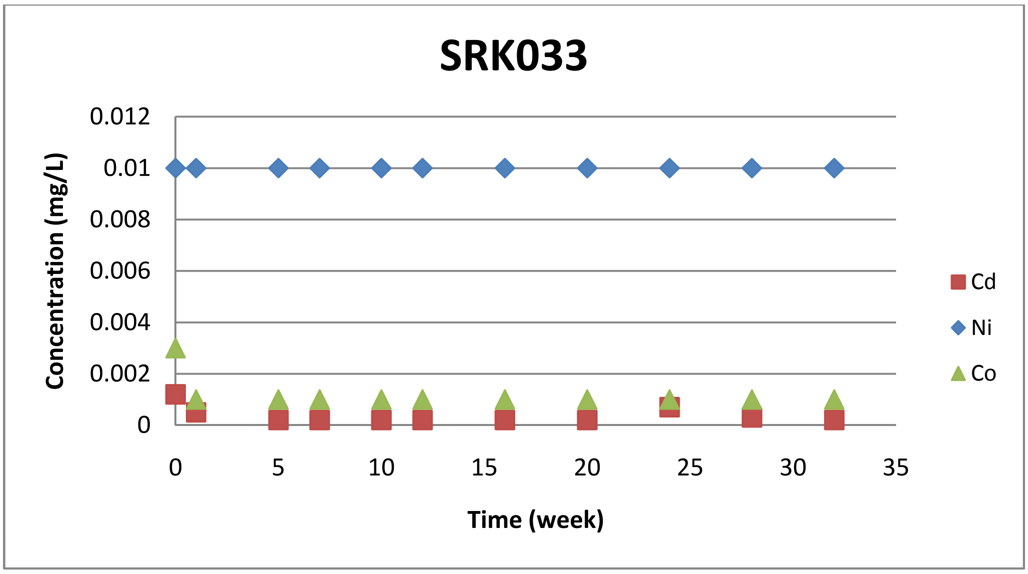
Client: AGA
Project: Tropicana
Project No: AGA001
Test: HC 1
Sample = SRK033

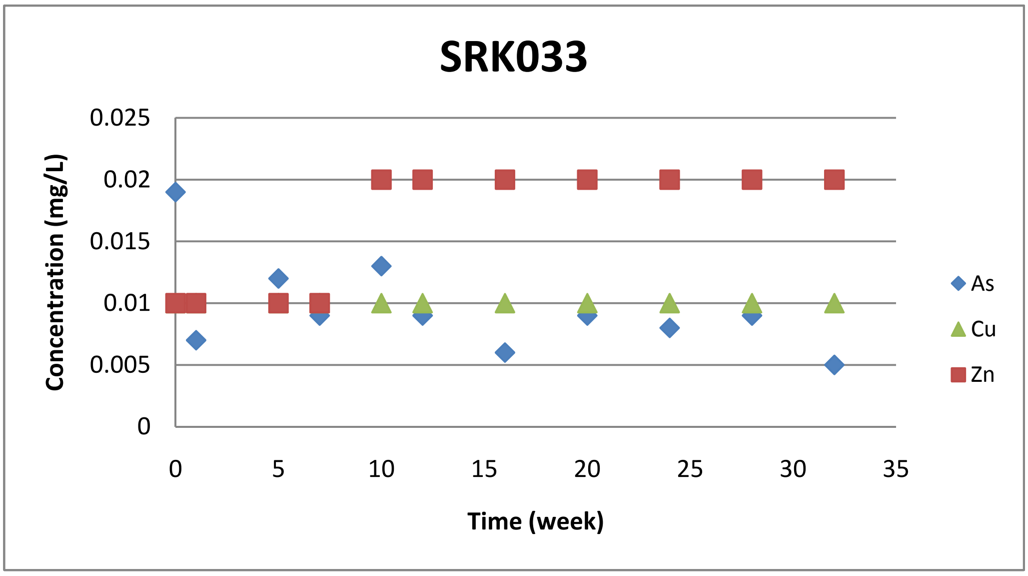
Date	Cycle	Sn	Ti	U	V	Zn	Zr
		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
LOD		0.00001	0.0005	0.000002	0.0002	0.0001	0.0001
31/05/2008	0	< 0.001		0.00042	< 0.01	< 0.01	
7/06/2008	1	< 0.001		0.00191	< 0.01	< 0.01	
14/06/2008	2						
21/06/2008	3						
5/07/2008	5	0.001		0.00175	< 0.01	0.01	
12/07/2008	6						
19/07/2008	7	< 0.001		0.00113	< 0.01	0.01	
26/07/2008	8						
2/08/2008	9						
9/08/2008	10	0.002		0.00098	< 0.01	0.02	
16/08/2008	11						
23/08/2008	12	< 0.001		0.00097	< 0.01	0.02	
30/08/2008	13						
6/09/2008	14						
13/09/2008	15						
20/09/2008	16	< 0.001		0.00098	< 0.01	0.02	
27/09/2008	17						
4/10/2008	18						
11/10/2008	19						
18/10/2008	20	< 0.001		0.00085	< 0.01	0.02	
25/10/2008	21						
1/11/2008	22						
8/11/2008	23						
15/11/2008	24	< 0.001		0.00091	< 0.01	0.02	
22/11/2008	25						
29/11/2008	26						
6/12/2008	27						
13/12/2008	28	< 0.001		0.00103	< 0.01	0.02	
20/12/2008	29						
27/12/2008	30						
3/01/2009	31						
10/01/2009	32	< 0.001		0.00073	< 0.01	0.02	

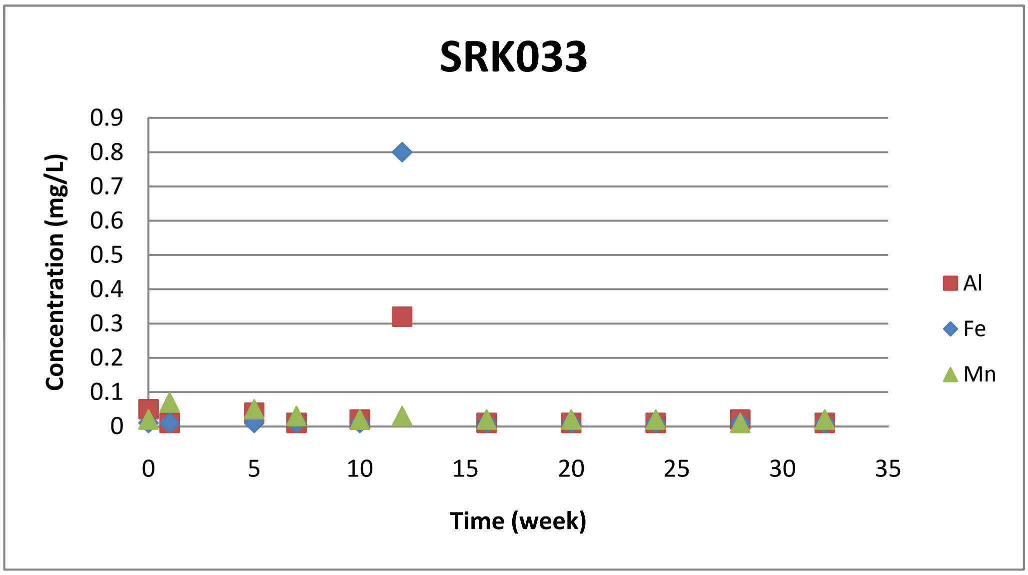

SRK033
Concentration (mg/L)
14
12
10
8
6
4
2
0
0
5
10
15
20
25
30
35
Time (week)
SO4


SRK033
Concentration (mg/L)
10
8
6
4
2
0
0
5
10
15
20
25
30
35
Time (week)
Ca
Mg


SRK033
Molar ratio
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
10.00
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
0
5
10
15
20
25
30
35
Time (week)
SO4/(Ca+Mg)
pH


SRK033
Concentration (mg/L)
0.012
0.01
0.008
0.006
0.004
0.002
0
0
5
10
15
20
25
30
35
Time (week)
Cd
Ni
Co


SRK033
Concentration (mg/L)
0.025
0.02
0.015
0.01
0.005
0
0
5
10
15
20
25
30
35
Time (week)
As
Cu
Zn


SRK033
Concentration (mg/L)
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
0
5
10
15
20
25
30
35
Time (week)
Al
Fe
Mn

Client: AGA
Project: Tropicana
Project No: AGA001
Test: HC 1
Sample = SRK051

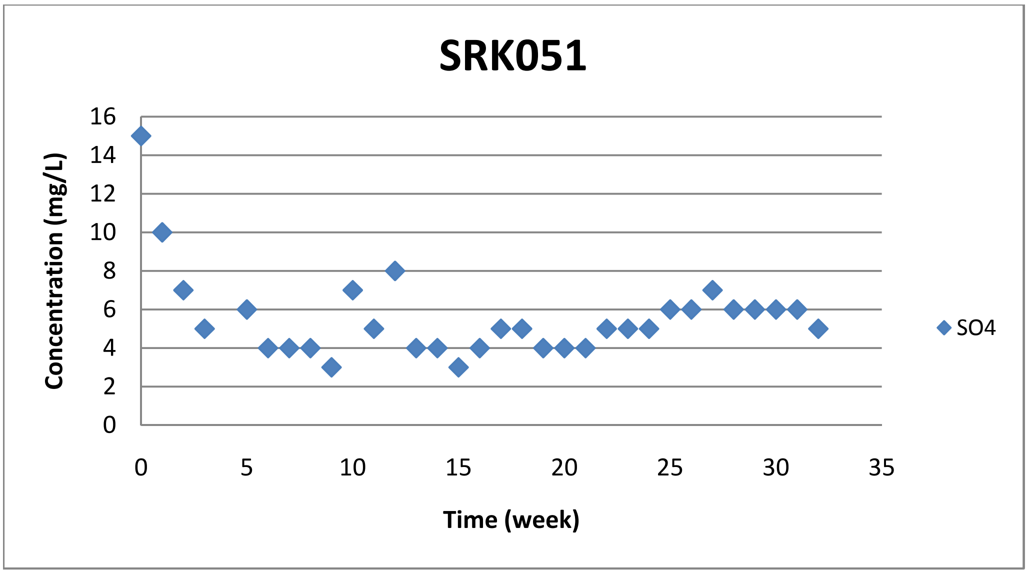
Date	Cycle	Volume mL		pH	ORP	Cond.	Acidity	Acidity	Alkalinity	Sulphate	Chloride	Fluoride	Hardness	Al	Sb	As	Ba	Be	Bi	B
		Input	Output		SHE	umhos/cm	(pH 4.5)	(pH 8.3)					CaCO3							
					mV		mgCaCO3/L	mgCaCO3/L	mgCaCO3/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
LOD		5	5	0.01	1.00	1	0.1	0.1	0.1	1	0.5	0.05	#N/A	0.0002	0.00002	0.00002	0.00002	0.00001	0.000005	0.005
31/05/2008	0	1000.00	850.00	7.10		170		< 5.0	22	15				0.08	0.0081	0.012	0.0736	< 0.001		
7/06/2008	1	1000.00	850.00	7.00		75		7	17	10				< 0.01	0.0044	0.009	0.052	< 0.001		
14/06/2008	2	1000.00	850.00	6.90		60		7	19	7										
21/06/2008	3	1000.00	860.00	7.00		59		7	20	5										
5/07/2008	5	1000.00	860.00	6.80		55		7	15	6				0.02	0.0031	0.009	0.0677	< 0.001		
12/07/2008	6	1000.00	840.00	6.50		34		7	12	4										
19/07/2008	7	1000.00	860.00	6.90		36		< 5.0	15	4				< 0.01	0.0021	0.004	0.0416	< 0.001		
26/07/2008	8	1000.00	870.00	6.60		33		< 5.0	15	4										
2/08/2008	9	1000.00	870.00	6.80		83		5	12	3										
9/08/2008	10	1000.00	870.00	6.60		35		< 5.0	11	7	3			0.01	0.0018	0.014	0.027	< 0.001		
16/08/2008	11	1000.00	860.00	6.60		28		14	10	5										
23/08/2008	12	1000.00	870.00	6.80		35		19	11	8	1			< 0.01	0.0021	0.009	0.0379	< 0.001		
30/08/2008	13	1000.00	880.00	6.40		55		10	7	4										
6/09/2008	14	1000.00	870.00	6.50		34		7	9.3	4										
13/09/2008	15	1000.00	880.00	6.30		27		< 5.0	9	3	1									
20/09/2008	16	1000.00	880.00	7.10		21		< 5.0	20	4	< 1.0			0.02	0.0017	0.005	0.0264	< 0.001		
27/09/2008	17	1000.00	880.00	6.50		25		< 5.0	10	5	< 1.0									
4/10/2008	18	1000.00	880.00	6.60		22		< 5.0	10	5	< 1.0									
11/10/2008	19	1000.00	880.00	6.60		25		< 5.0	7	4	< 1.0									
18/10/2008	20	1000.00	880.00	6.60		22		< 5.0	8	4	< 1.0			< 0.01	0.0016	0.007	0.033	< 0.001		
25/10/2008	21	1000.00	880.00	6.60		20		5	7	4	< 1.0									
1/11/2008	22	1000.00	880.00	6.70		23		5	7	5	1									
8/11/2008	23	1000.00	880.00	6.70		43		5	7	5	7									
15/11/2008	24	1000.00	880.00	6.80		23		5	7	5	< 1.0			< 0.01	0.0017	0.006	0.0352	< 0.001		
22/11/2008	25	1000.00	880.00	6.70		24		5	7	6	< 1.0									
29/11/2008	26	1000.00	880.00	6.40		42		< 5.0	8	6	5									
6/12/2008	27	1000.00	880.00	6.50		27		5	7	7	1									
13/12/2008	28	1000.00	880.00	6.50		25		5	7	6	< 1.0			0.02	0.0016	0.007	0.0243	0.001		
20/12/2008	29	1000.00	880.00	6.40		25		< 5.0	7	6	< 1.0									
27/12/2008	30	1000.00	880.00	6.10		26		< 5.0	6	6	< 1.0									
3/01/2009	31	1000.00	880.00	6.20		26		< 5.0	7	6	< 1.0									
10/01/2009	32	1000.00	880.00	6.30		36		< 5.0	7	5	< 1.0			0.01	0.0015	0.003	0.0312	< 0.001		

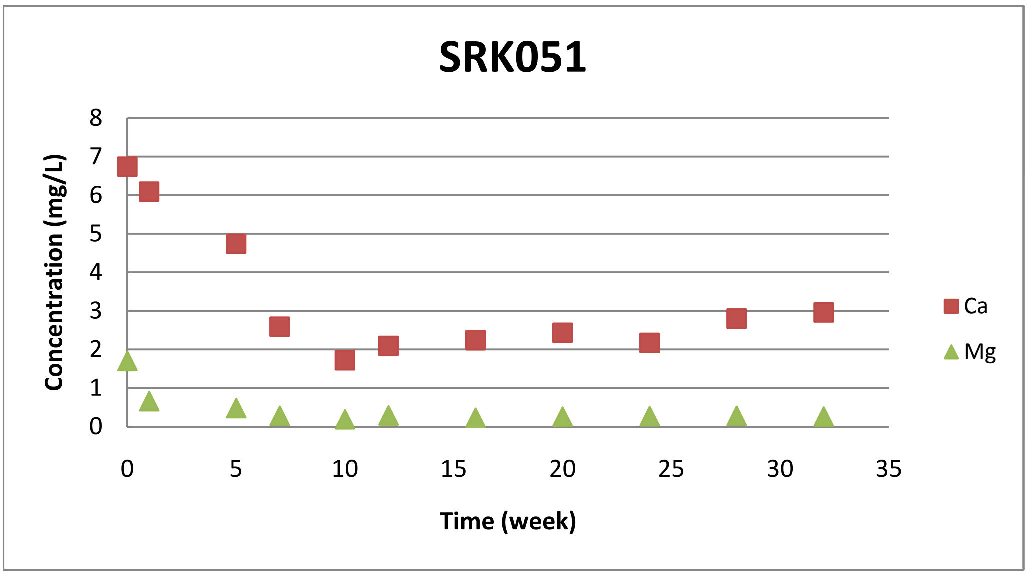
Client: AGA
Project: Tropicana
Project No: AGA001
Test: HC 1
Sample = SRK051

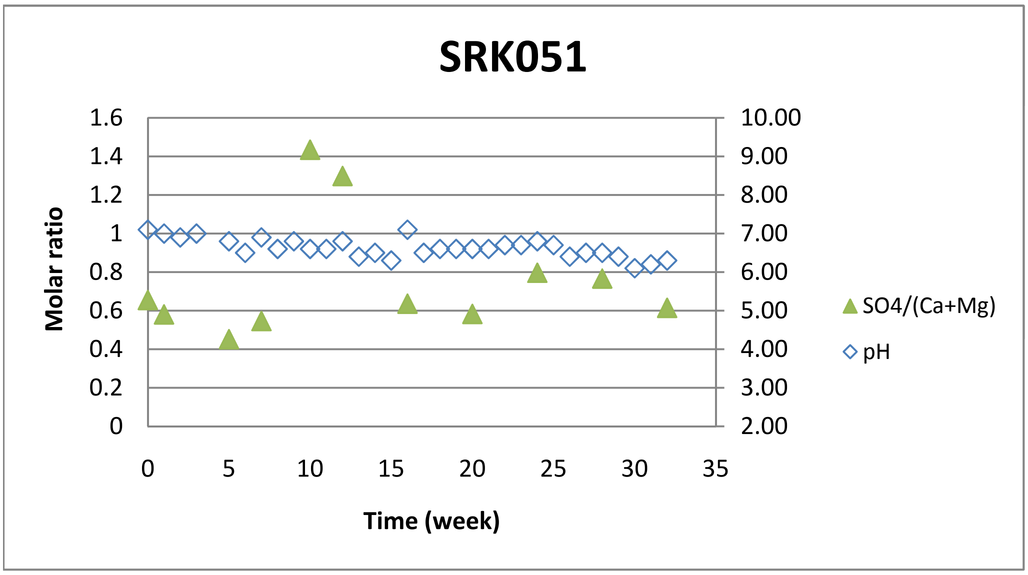
Date	Cycle	Cd	Ca	Cr	Co	Cu	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl
		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
LOD		0.000005	0.05	0.0001	0.000005	0.00005	0.001	0.000005	0.0005	0.05	0.00005	0.01	0.00005	0.00002	0.002	0.05	0.00004	0.1	0.000005	0.05	5E-05	3	0.000002
31/05/2008	0	0.0009	6.74	< 0.01	0.004	< 0.01	< 0.01	< 0.005		1.7	< 0.1	< 0.1	0.0104	< 0.01	< 0.1	9.3	0.006		< 0.0001		1.147		< 0.0001
7/06/2008	1	0.0004	6.09	< 0.01	0.001	< 0.01	< 0.01	< 0.005		0.66	0.04	< 0.1	0.0045	< 0.01	< 0.1	2.8	< 0.005		< 0.0001		0.8378		0.0001
14/06/2008	2																						
21/06/2008	3																						
5/07/2008	5	< 0.0002	4.74	< 0.01	< 0.001	< 0.01	< 0.01	< 0.005		0.48	0.04	< 0.1	0.0029	< 0.01	< 0.1	2.5	< 0.005		< 0.0001		0.4845		0.0002
12/07/2008	6																						
19/07/2008	7	< 0.0002	2.59	< 0.01	< 0.001	< 0.01	< 0.01	< 0.005		0.28	0.02	0.1	0.0018	< 0.01	< 0.1	1.7	< 0.005		< 0.0001	2.8	0.3048		0.0002
26/07/2008	8																						
2/08/2008	9																						
9/08/2008	10	< 0.0002	1.72	< 0.01	< 0.001	< 0.01	< 0.01	< 0.005		0.19	0.01	< 0.1	0.0025	< 0.01	< 0.1	1.6	< 0.005		< 0.0001	2.1	0.2118		0.0001
16/08/2008	11																						
23/08/2008	12	< 0.0002	2.09	< 0.01	< 0.001	< 0.01	0.06	0.009		0.29	0.01	< 0.1	0.0021	< 0.01	< 0.1	1.5	< 0.005		0.0001	2.1	0.2822		0.0001
30/08/2008	13																						
6/09/2008	14																						
13/09/2008	15																						
20/09/2008	16	< 0.0002	2.24	< 0.01	< 0.001	< 0.01	< 0.01	< 0.005		0.23	0.01	< 0.1	0.0022	< 0.01	< 0.1	1.8	< 0.005		< 0.0001	1.3	0.2833		0.0001
27/09/2008	17																						
4/10/2008	18																						
11/10/2008	19																						
18/10/2008	20	< 0.0002	2.43	< 0.01	< 0.001	< 0.01	< 0.01	< 0.005		0.26	0.01	< 0.1	0.0027	< 0.01	< 0.1	1.7	< 0.005		< 0.0001	1.1	0.3395		< 0.0001
25/10/2008	21																						
1/11/2008	22																						
8/11/2008	23																						
15/11/2008	24	0.0006	2.17	< 0.01	< 0.001	< 0.01	< 0.01	< 0.005		0.27	< 0.1	< 0.1	0.0024	< 0.01	< 0.1	1.7	< 0.005		< 0.0001	1.2	0.3186		< 0.0001
22/11/2008	25																						
29/11/2008	26																						
6/12/2008	27																						
13/12/2008	28	0.0002	2.8	< 0.01	< 0.001	< 0.01	< 0.01	0.008		0.28	< 0.1	< 0.1	0.0018	< 0.01	< 0.1	1.7	< 0.005		0.0001	1.3	0.3272		< 0.0001
20/12/2008	29																						
27/12/2008	30																						
3/01/2009	31																						
10/01/2009	32	< 0.0002	2.96	< 0.01	0.001	< 0.01	< 0.01	< 0.005		0.26	0.01	< 0.1	0.0026	< 0.01	< 0.1	1.8	< 0.005		< 0.0001	1.2	0.3607		0.0001

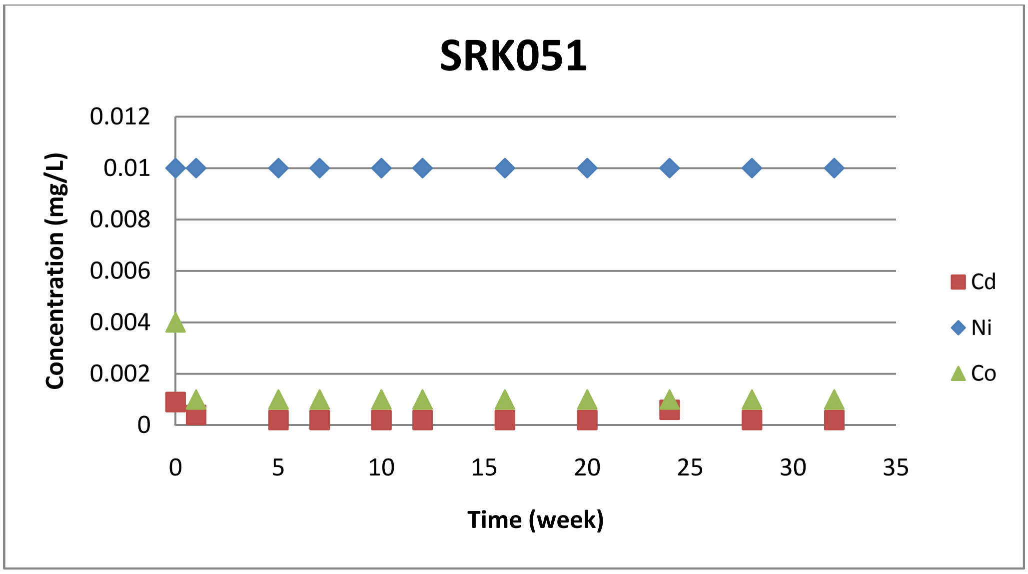
Client: AGA
Project: Tropicana
Project No: AGA001
Test: HC 1
Sample = SRK051

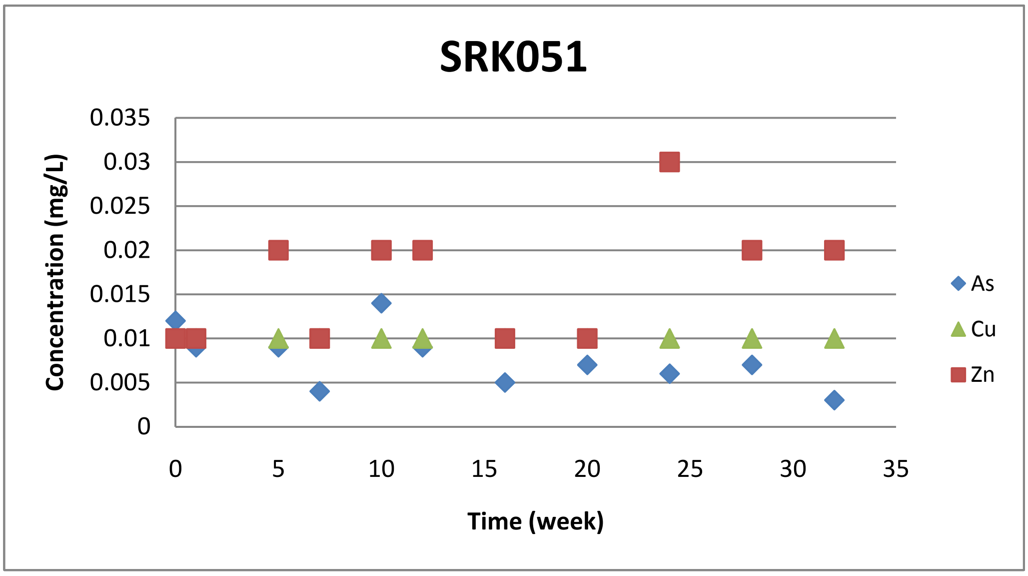
Date	Cycle	Sn	Ti	U	V	Zn	Zr
		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
LOD		0.00001	0.0005	0.000002	0.0002	0.0001	0.0001
31/05/2008	0	< 0.001		0.00034	< 0.01	< 0.01	
7/06/2008	1	< 0.001		0.00102	< 0.01	< 0.01	
14/06/2008	2						
21/06/2008	3						
5/07/2008	5	< 0.001		0.00104	< 0.01	0.02	
12/07/2008	6						
19/07/2008	7	< 0.001		0.00069	< 0.01	< 0.01	
26/07/2008	8						
2/08/2008	9						
9/08/2008	10	< 0.001		0.00054	< 0.01	0.02	
16/08/2008	11						
23/08/2008	12	< 0.001		0.00057	< 0.01	0.02	
30/08/2008	13						
6/09/2008	14						
13/09/2008	15						
20/09/2008	16	< 0.001		0.0004	< 0.01	0.01	
27/09/2008	17						
4/10/2008	18						
11/10/2008	19						
18/10/2008	20	0.001		0.00033	< 0.01	0.01	
25/10/2008	21						
1/11/2008	22						
8/11/2008	23						
15/11/2008	24	< 0.001		0.00032	< 0.01	0.03	
22/11/2008	25						
29/11/2008	26						
6/12/2008	27						
13/12/2008	28	< 0.001		0.00031	< 0.01	0.02	
20/12/2008	29						
27/12/2008	30						
3/01/2009	31						
10/01/2009	32	< 0.001		0.0002	< 0.01	0.02	

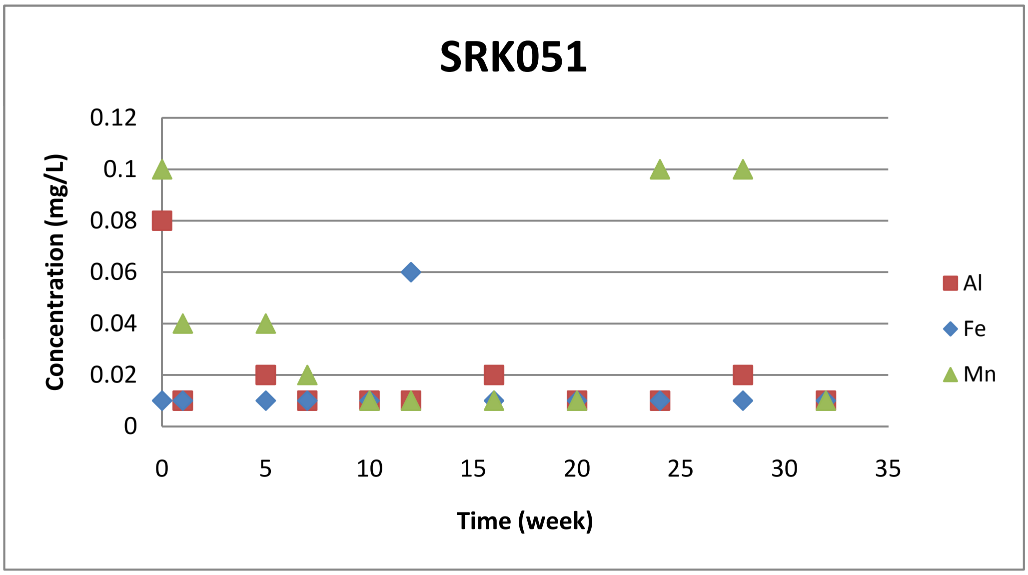

SRK051
Concentration (mg/L)
16
14
12
10
8
6
4
2
0
0
5
10
15
20
25
30
35
Time (week)
SO4


SRK051
Concentration (mg/L)
8
7
6
5
4
3
2
1
0
0
5
10
15
20
25
30
35
Time (week)
Ca
Mg


SRK051
Molar ratio
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
10.00
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
0
5
10
15
20
25
30
35
Time (week)
SO4/(Ca+Mg)
pH


SRK051
Concentration (mg/L)
0.012
0.01
0.008
0.006
0.004
0.002
0
0 5 10 15 20 25 30 35
Time (week)
Cd
Ni
Co


SRK051
Concentration (mg/L)
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
0 5 10 15 20 25 30 35
Time (week)
As
Cu
Zn


SRK051
Concentration (mg/L)
0.12
0.1
0.08
0.06
0.04
0.02
0
0 5 10 15 20 25 30 35
Time (week)
Al
Fe
Mn

Client: AGA
Project: Tropicana
Project No: AGA001
Test: HC 1
Sample = SRK054

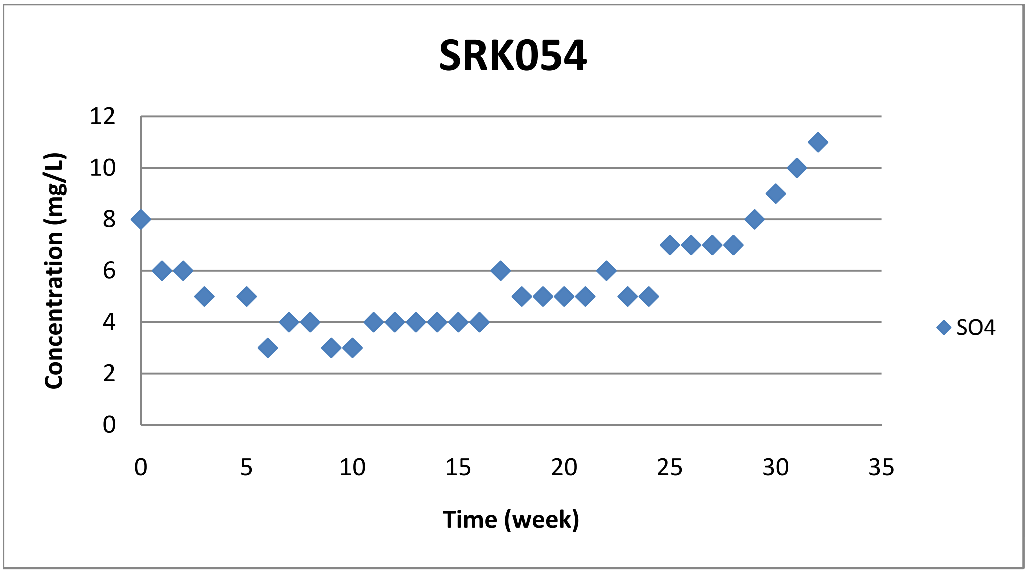
Date	Cycle	Volume mL		pH	ORP	Cond.	Acidity	Acidity	Alkalinity	Sulphate	Chloride	Fluoride	Hardness	Al	Sb	As	Ba	Be	Bi	B
		Input	Output		SHE	umhos/cm	(pH 4.5)	(pH 8.3)					CaCO3							
					mV		mgCaCO3/L	mgCaCO3/L	mgCaCO3/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
LOD		5	5	0.01	1.00	1	0.1	0.1	0.1	1	0.5	0.05	#N/A	0.0002	0.00002	0.00002	0.00002	0.00001	0.000005	0.005
31/05/2008	0	1000.00	860.00	7.20		97		< 5.0	27	8				0.07	0.0033	0.012	0.0673	< 0.001		
7/06/2008	1	1000.00	840.00	7.20		65		7	20	6				0.04	0.0019	0.008	0.0676	< 0.001		
14/06/2008	2	1000.00	880.00	7.20		67		7	24	6										
21/06/2008	3	1000.00	860.00	7.10		68		5	28	5										
5/07/2008	5	1000.00	860.00	6.90		63		7	21	5				0.05	0.0018	0.008	< 0.001	< 0.001		
12/07/2008	6	1000.00	830.00	6.50		31		7	13	3										
19/07/2008	7	1000.00	870.00	7.00		33		< 5.0	12	4				< 0.01	0.0008	0.006	0.0697	< 0.001		
26/07/2008	8	1000.00	860.00	6.70		31		< 5.0	14	4										
2/08/2008	9	1000.00	860.00	6.70		57		< 5.0	11	3										
9/08/2008	10	1000.00	860.00	6.80		35		< 5.0	12	3	1			0.02	0.0006	0.012	0.0407	< 0.001		
16/08/2008	11	1000.00	850.00	6.60		23		< 5.0	9.7	4										
23/08/2008	12	1000.00	870.00	6.80		27		16	12	4	< 1.0			< 0.01	0.0007	0.008	0.0614	< 0.001		
30/08/2008	13	1000.00	860.00	6.40		49		8	9.5	4										
6/09/2008	14	1000.00	860.00	6.40		28		8	6	4										
13/09/2008	15	1000.00	860.00	6.30		25		5	6	4	1									
20/09/2008	16	1000.00	860.00	6.30		11		< 5.0	7	4	1			0.01	0.0004	0.004	0.0437	< 0.001		
27/09/2008	17	1000.00	860.00	6.60		24		< 5.0	10	6	< 1.0									
4/10/2008	18	1000.00	860.00	6.50		20		< 5.0	7	5	< 1.0									
11/10/2008	19	1000.00	860.00	6.50		21		< 5.0	7	5	< 1.0									
18/10/2008	20	1000.00	860.00	6.70		22		< 5.0	7	5	< 1.0			< 0.01	0.0004	0.006	0.0557	< 0.001		
25/10/2008	21	1000.00	860.00	6.60		19		< 5.0	7	5	< 1.0									
1/11/2008	22	1000.00	860.00	6.70		26		5	7	6	< 1.0									
8/11/2008	23	1000.00	860.00	6.70		23		< 5.0	7	5	< 1.0									
15/11/2008	24	1000.00	860.00	6.70		49		5	7	5	8			< 0.01	0.0005	0.007	0.0677	< 0.001		
22/11/2008	25	1000.00	860.00	6.70		24		5	7	7	< 1.0									
29/11/2008	26	1000.00	860.00	6.40		28		5	7	7	< 1.0									
6/12/2008	27	1000.00	860.00	6.50		29		5	7	7	1									
13/12/2008	28	1000.00	860.00	6.50		41		5	7	7	4			0.01	0.0004	0.005	0.0519	0.001		
20/12/2008	29	1000.00	860.00	6.40		25		< 5.0	7	8	< 1.0									
27/12/2008	30	1000.00	860.00	6.10		30		< 5.0	7	9	< 1.0									
3/01/2009	31	1000.00	860.00	6.30		32		< 5.0	7	10	< 1.0									
10/01/2009	32	1000.00	860.00	6.20		32		< 5.0	7	11	< 1.0			< 0.01	0.0005	0.003	0.0911	< 0.001		

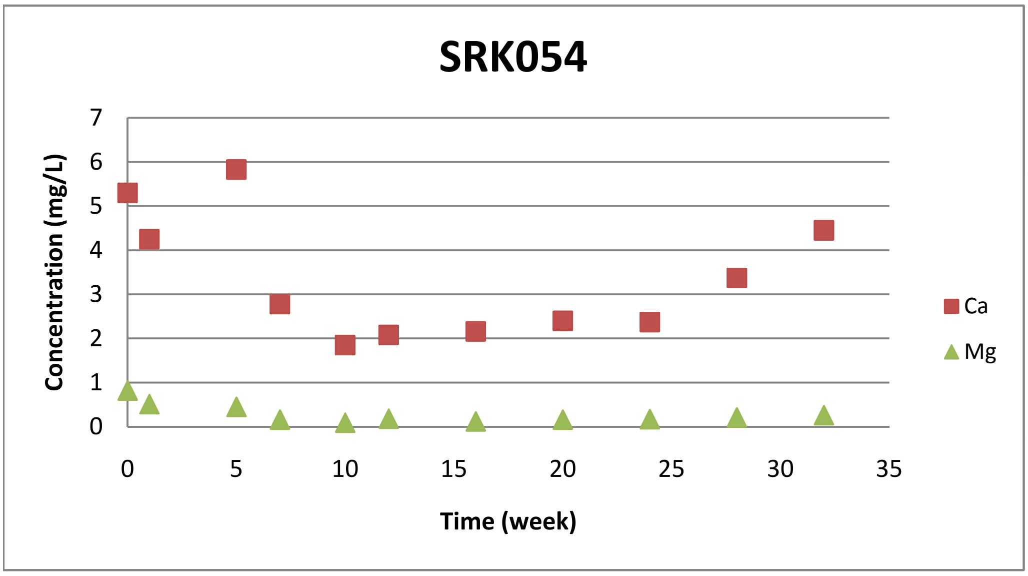
Client: AGA
Project: Tropicana
Project No: AGA001
Test: HC 1
Sample = SRK054

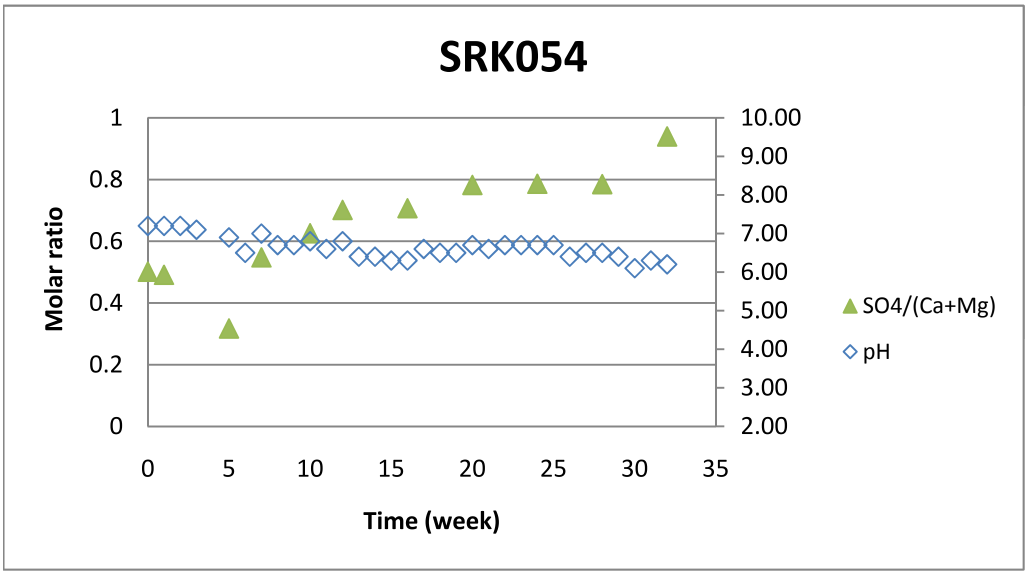
Date	Cycle	Cd	Ca	Cr	Co	Cu	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S
		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
LOD		0.000005	0.05	0.0001	0.000005	0.00005	0.001	0.000005	0.0005	0.05	0.00005	0.01	0.00005	0.00002	0.002	0.05	0.00004	0.1	0.000005	0.05	5E-05	3
31/05/2008	0	0.0006	5.3	< 0.01	0.004	< 0.01	< 0.01	< 0.005		0.82	< 0.01	< 0.1	0.0041	< 0.01	< 0.1	6.8	< 0.005		< 0.0001		1.0856	
7/06/2008	1	< 0.0002	4.25	< 0.01	0.001	< 0.01	< 0.01	< 0.005		0.51	0.02	< 0.1	0.0033	< 0.01	< 0.1	3.1	< 0.005		< 0.0001		0.9522	
14/06/2008	2																					
21/06/2008	3																					
5/07/2008	5	< 0.0002	5.83	< 0.01	< 0.001	< 0.01	< 0.01	< 0.005		0.45	0.03	< 0.1	0.002	< 0.01	< 0.1	3.1	< 0.005		< 0.0001		0.755	
12/07/2008	6																					
19/07/2008	7	0.0003	2.78	< 0.01	0.001	< 0.01	< 0.01	< 0.005		0.16	0.02	0.1	0.0009	< 0.01	< 0.1	1.6	< 0.005		< 0.0001		0.356	
26/07/2008	8																					
2/08/2008	9																					
9/08/2008	10	< 0.0002	1.85	< 0.01	< 0.001	< 0.01	< 0.01	< 0.005		0.09	0.02	< 0.1	0.0014	< 0.01	< 0.1	1.5	< 0.005		< 0.0001	1.7	0.2131	
16/08/2008	11																					
23/08/2008	12	< 0.0002	2.08	< 0.01	< 0.001	< 0.01	0.06	< 0.005		0.18	0.02	< 0.1	0.0011	< 0.01	< 0.1	1.4	< 0.005		< 0.0001	1.6	0.255	
30/08/2008	13																					
6/09/2008	14																					
13/09/2008	15																					
20/09/2008	16	< 0.0002	2.16	< 0.01	< 0.001	< 0.01	< 0.01	< 0.005		0.12	0.01	< 0.1	0.0016	< 0.01	< 0.1	1.6	< 0.005		< 0.0001	1	0.2721	
27/09/2008	17																					
4/10/2008	18																					
11/10/2008	19																					
18/10/2008	20	< 0.0002	2.4	< 0.01	< 0.001	< 0.01	< 0.01	< 0.005		0.16	0.02	< 0.1	0.0016	< 0.01	< 0.1	1.6	< 0.005		< 0.0001	1	0.3811	
25/10/2008	21																					
1/11/2008	22																					
8/11/2008	23																					
15/11/2008	24	0.0006	2.37	< 0.01	0.001	< 0.01	< 0.01	< 0.005		0.17	0.01	< 0.1	0.0011	< 0.01	< 0.1	9.8	< 0.005		< 0.0001	1	0.3407	
22/11/2008	25																					
29/11/2008	26																					
6/12/2008	27																					
13/12/2008	28	< 0.0002	3.37	< 0.01	< 0.001	< 0.01	< 0.01	< 0.005		0.21	0.01	< 0.1	0.0005	< 0.01	< 0.1	6	< 0.005		0.0001	1.2	0.3516	
20/12/2008	29																					
27/12/2008	30																					
3/01/2009	31																					
10/01/2009	32	< 0.0002	4.45	< 0.01	0.002	< 0.01	< 0.01	0.013		0.26	0.02	< 0.1	0.0014	< 0.01	< 0.1	2	< 0.005		0.0001	1.1	0.4732	

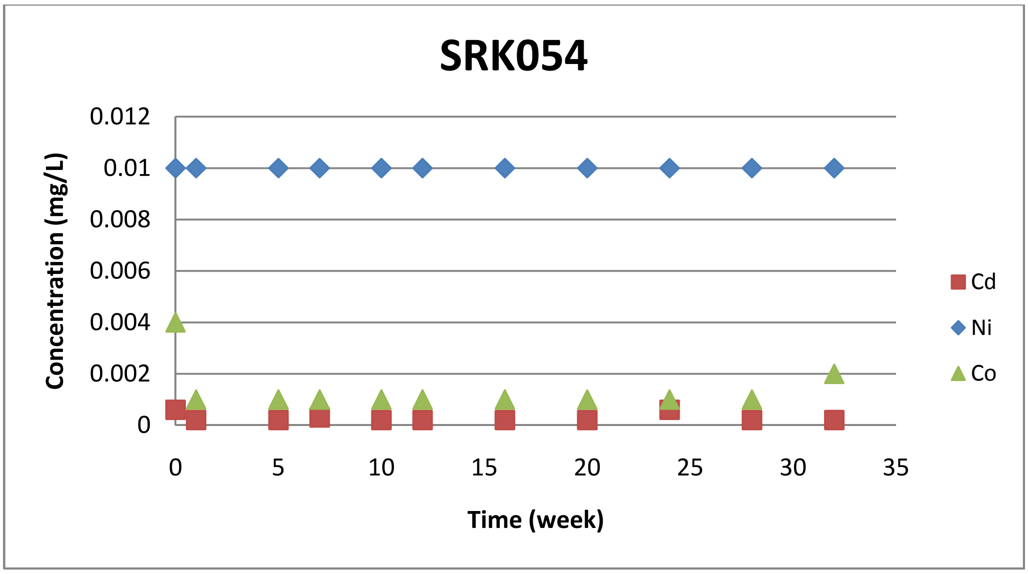
Client: AGA
Project: Tropicana
Project No: AGA001
Test: HC 1
Sample = SRK054

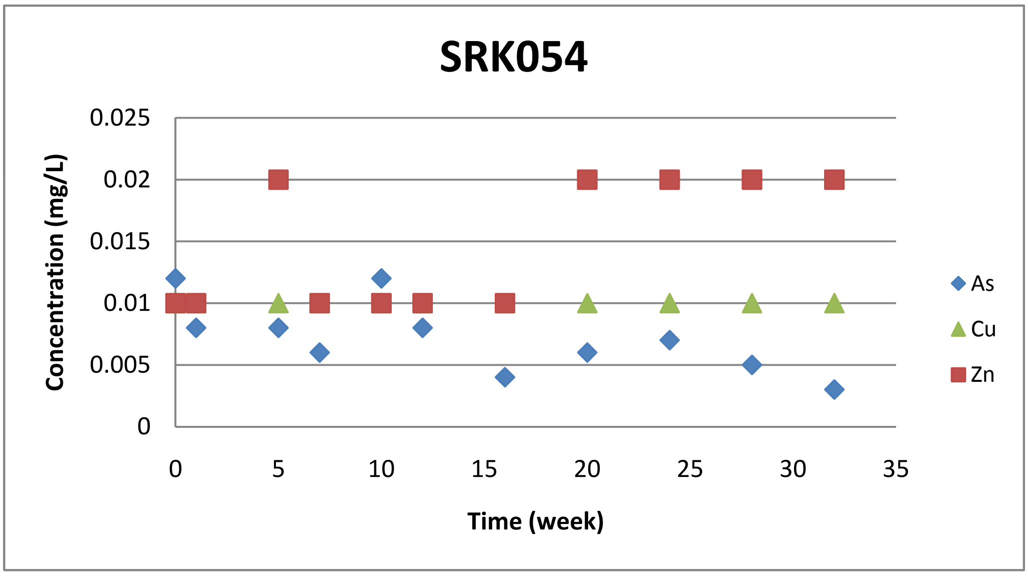
Date	Cycle	Tl	Sn	Ti	U	V	Zn	Zr
		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
LOD		0.000002	0.00001	0.0005	0.000002	0.0002	0.0001	0.0001
31/05/2008	0	< 0.0001	< 0.001		0.00016	< 0.01	< 0.01	
7/06/2008	1	0.0001	< 0.001		0.00094	< 0.01	< 0.01	
14/06/2008	2							
21/06/2008	3							
5/07/2008	5	< 0.0001	< 0.001		0.00139	< 0.01	0.02	
12/07/2008	6							
19/07/2008	7	0.0001	< 0.001		0.00043	< 0.01	< 0.01	
26/07/2008	8							
2/08/2008	9							
9/08/2008	10	< 0.0001	< 0.001		0.00034	< 0.01	< 0.01	
16/08/2008	11							
23/08/2008	12	0.0001	< 0.001		0.00025	< 0.01	< 0.01	
30/08/2008	13							
6/09/2008	14							
13/09/2008	15							
20/09/2008	16	< 0.0001	< 0.001		0.00016	< 0.01	0.01	
27/09/2008	17							
4/10/2008	18							
11/10/2008	19							
18/10/2008	20	< 0.0001	< 0.001		0.00013	< 0.01	0.02	
25/10/2008	21							
1/11/2008	22							
8/11/2008	23							
15/11/2008	24	< 0.0001	< 0.001		0.00009	< 0.01	0.02	
22/11/2008	25							
29/11/2008	26							
6/12/2008	27							
13/12/2008	28	< 0.0001	< 0.001		0.00008	< 0.01	0.02	
20/12/2008	29							
27/12/2008	30							
3/01/2009	31							
10/01/2009	32	0.0001	< 0.001		0.00017	< 0.01	0.02	

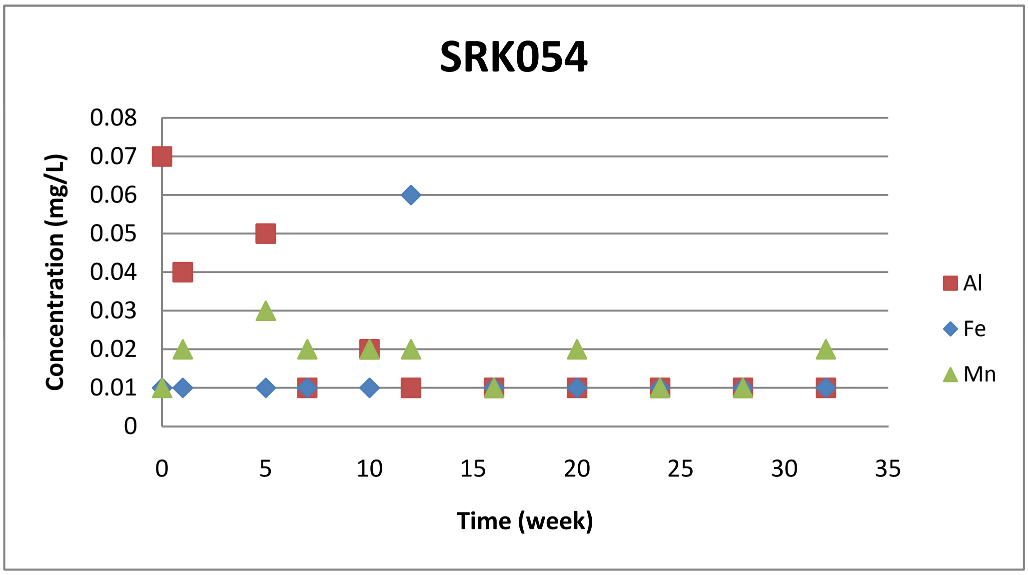

SRK054
Concentration (mg/L)
Time (week)
SO4


SRK054
Concentration (mg/L)
Time (week)
Ca
Mg


SRK054
Molar ratio
Time (week)
SO4/(Ca+Mg)
pH


SRK054
Concentration (mg/L)
0.012
0.01
0.008
0.006
0.004
0.002
0
0
5
10
15
20
25
30
35
Time (week)
Cd
Ni
Co


SRK054
Concentration (mg/L)
0.025
0.02
0.015
0.01
0.005
0
0
5
10
15
20
25
30
35
Time (week)
As
Cu
Zn


SRK054
Concentration (mg/L)
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
0
5
10
15
20
25
30
35
Time (week)
Al
Fe
Mn

Client: AGA
Project: Tropicana
Project No: AGA001
Test: HC 1
Sample = SRK075

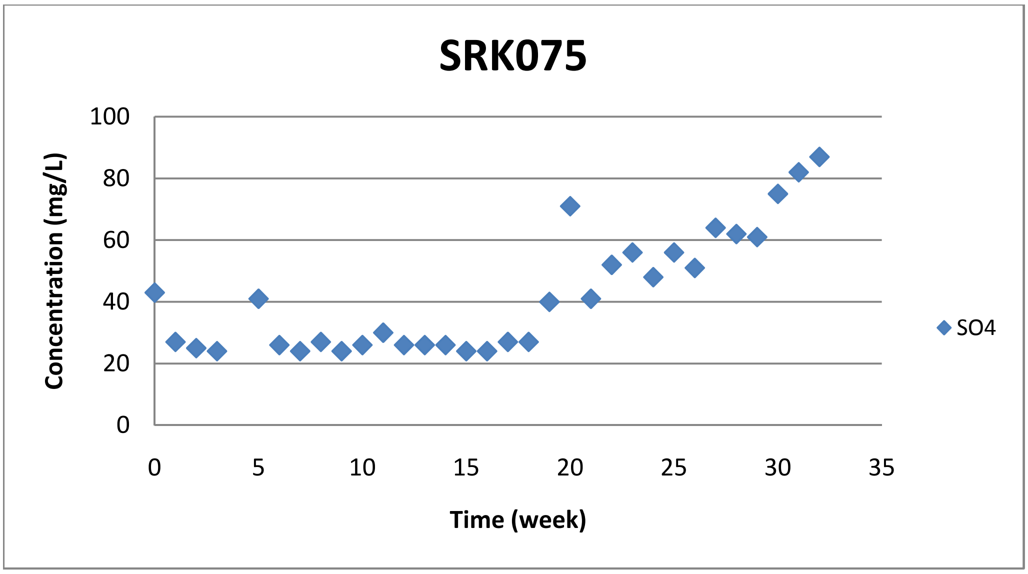
Date	Cycle	Volume mL		pH	ORP	Cond.	Acidity	Acidity	Alkalinity	Sulphate	Chloride	Fluoride	Hardness	Al	Sb	As	Ba	Be	Bi	B
		Input	Output		SHE	umhos/cm	(pH 4.5)	(pH 8.3)					CaCO3							
					mV		mgCaCO3/L	mgCaCO3/L	mgCaCO3/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
LOD		5	5	0.01	1.00	1	0.1	0.1	0.1	1	0.5	0.05	#N/A	0.0002	0.00002	0.00002	0.00002	0.00001	0.000005	0.005
31/05/2008	0	1000.00	810.00	6.90		250		< 5.0	19	43				0.03	0.0044	0.006	0.0664	< 0.001		
7/06/2008	1	1000.00	840.00	7.00		180		8	18	27				< 0.01	0.0031	0.004	0.0638	< 0.001		
14/06/2008	2	1000.00	860.00	6.80		130		8	16	25										
21/06/2008	3	1000.00	870.00	6.80		150		7	17	24										
5/07/2008	5	1000.00	850.00	6.60		180		7	17	41				< 0.01	0.0031	0.005	0.1025	< 0.001		
12/07/2008	6	1000.00	840.00	6.60		120		9	12	26										
19/07/2008	7	1000.00	870.00	6.80		100		< 5.0	15	24				< 0.01	0.0018	0.006	0.0591	< 0.001		
26/07/2008	8	1000.00	860.00	6.70		100		< 5.0	13	27										
2/08/2008	9	1000.00	860.00	6.60		210		< 5.0	10	24										
9/08/2008	10	1000.00	860.00	6.60		110		< 5.0	10	26	5			0.02	0.0015	0.01	0.044	< 0.001		
16/08/2008	11	1000.00	850.00	6.60		97		16	11	30										
23/08/2008	12	1000.00	860.00	6.60		95		14	11	26	3			0.4	0.0015	0.009	0.0605	< 0.001		
30/08/2008	13	1000.00	860.00	6.40		110		10	7	26										
6/09/2008	14	1000.00	860.00	6.40		95		7	7	26										
13/09/2008	15	1000.00	860.00	6.40		82		5	9.2	24	2									
20/09/2008	16	1000.00	860.00	6.30		71		5	7	24	2			< 0.01	0.0017	0.003	0.0429	< 0.001		
27/09/2008	17	1000.00	860.00	6.50		80		< 5.0	10	27	2									
4/10/2008	18	1000.00	860.00	6.40		79		5	7	27	2									
11/10/2008	19	1000.00	860.00	6.40		97		< 5.0	7	40	2									
18/10/2008	20	1000.00	860.00	6.30		120		6	7	71	2			< 0.01	0.003	0.003	0.1212	< 0.001		
25/10/2008	21	1000.00	860.00	6.30		100		6	6	41	1									
1/11/2008	22	1000.00	860.00	6.40		130		5	7	52	2									
8/11/2008	23	1000.00	860.00	6.40		130		7	7	56	5									
15/11/2008	24	1000.00	860.00	6.40		120		5	7	48	1			< 0.01	0.0015	0.003	0.0802	< 0.001		
22/11/2008	25	1000.00	860.00	6.30		140		6	7	56	1									
29/11/2008	26	1000.00	860.00	6.20		130		< 5.0	6	51	1									
6/12/2008	27	1000.00	860.00	6.20		150		5	6	64	2									
13/12/2008	28	1000.00	860.00	5.90		160		7	6	62	4			< 0.01	0.0015	0.005	0.0918	0.001		
20/12/2008	29	1000.00	860.00	5.70		150		6	5	61	1									
27/12/2008	30	1000.00	860.00	5.00		160		5	7	75	1									
3/01/2009	31	1000.00	860.00	4.60		190		< 5.0	< 5.0	82	1									
10/01/2009	32	1000.00	860.00	4.80		200		5	< 5.0	87	1			0.01	0.0012	0.002	0.1765	< 0.001		

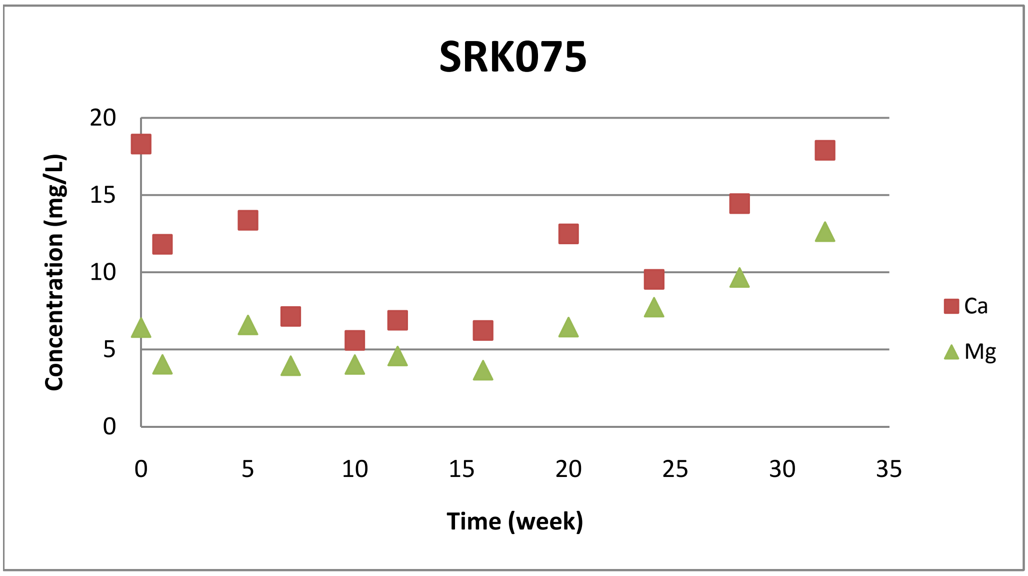
Client: AGA
Project: Tropicana
Project No: AGA001
Test: HC 1
Sample = SRK075

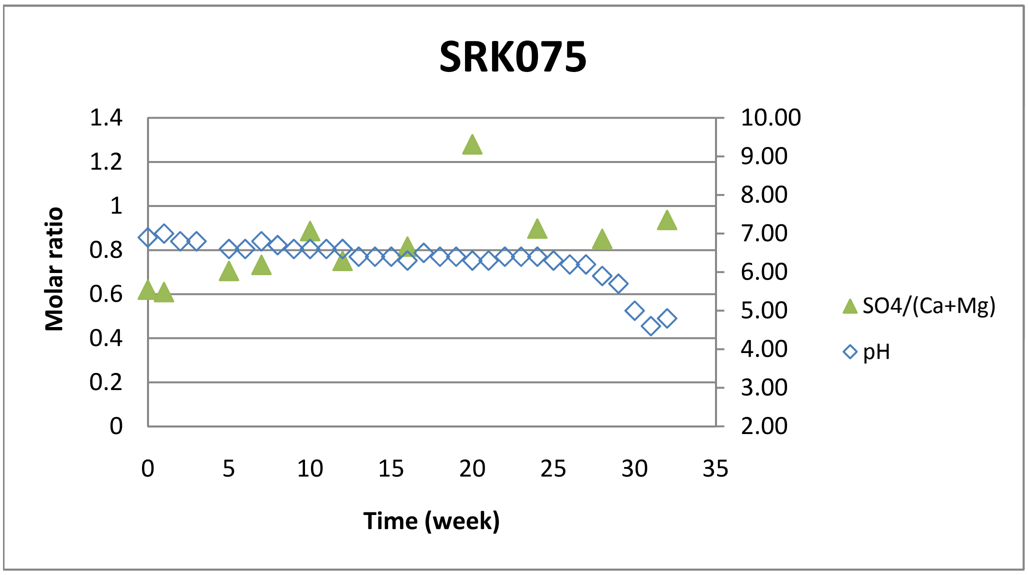
Date	Cycle	Cd	Ca	Cr	Co	Cu	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl
		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
LOD		0.000005	0.05	0.0001	0.000005	0.00005	0.001	0.000005	0.0005	0.05	0.00005	0.01	0.00005	0.00002	0.002	0.05	0.00004	0.1	0.000005	0.05	5E-05	3	0.000002
31/05/2008	0	0.0007	18.31	< 0.01	0.008	< 0.01	< 0.01	< 0.005		6.42	0.04	< 0.1	0.003	< 0.01	< 0.1	6.8	0.011		< 0.0001		1.61		< 0.0001
7/06/2008	1	< 0.0002	11.81	< 0.01	0.005	< 0.01	< 0.01	< 0.005		4.04	0.08	< 0.1	0.0014	< 0.01	< 0.1	3	0.008		0.0001		1.2391		0.0001
14/06/2008	2																						
21/06/2008	3																						
5/07/2008	5	< 0.0002	13.37	< 0.01	0.006	< 0.01	< 0.01	< 0.005		6.59	0.15	< 0.1	0.001	< 0.01	< 0.1	3.3	< 0.005		< 0.0001		0.972		0.0001
12/07/2008	6																						
19/07/2008	7	0.0002	7.14	< 0.01	0.005	< 0.01	< 0.01	< 0.005		3.95	0.07	< 0.1	0.0005	< 0.01	< 0.1	2	< 0.005		< 0.0001		0.4968		0.0001
26/07/2008	8																						
2/08/2008	9																						
9/08/2008	10	0.0002	5.59	< 0.01	0.006	< 0.01	< 0.01	< 0.005		4.03	0.06	< 0.1	0.0008	< 0.01	< 0.1	1.8	0.007		< 0.0001	2.6	0.354		< 0.0001
16/08/2008	11																						
23/08/2008	12	< 0.0002	6.89	< 0.01	0.007	< 0.01	1.14	< 0.005		4.58	0.1	< 0.1	< 0.0005	0.01	< 0.1	1.7	0.005		< 0.0001	2.2	0.3931		0.0001
30/08/2008	13																						
6/09/2008	14																						
13/09/2008	15																						
20/09/2008	16	< 0.0002	6.23	< 0.01	0.004	< 0.01	< 0.01	< 0.005		3.66	0.06	< 0.1	0.0006	< 0.01	< 0.1	1.7	< 0.005		< 0.0001	1.5	0.3804		< 0.0001
27/09/2008	17																						
4/10/2008	18																						
11/10/2008	19																						
18/10/2008	20	0.0003	12.49	< 0.01	0.044	< 0.01	< 0.01	< 0.005		6.45	0.31	< 0.1	0.0008	0.01	< 0.1	2.3	0.005		< 0.0001	1.5	0.7806		< 0.0001
25/10/2008	21																						
1/11/2008	22																						
8/11/2008	23																						
15/11/2008	24	0.0008	9.54	< 0.01	0.044	< 0.01	< 0.01	< 0.005		7.74	0.29	< 0.1	< 0.0005	0.01	< 0.1	1.7	< 0.005		< 0.0001	1.1	0.5198		< 0.0001
22/11/2008	25																						
29/11/2008	26																						
6/12/2008	27																						
13/12/2008	28	0.0005	14.45	< 0.01	0.046	< 0.01	0.11	< 0.005		9.66	0.33	< 0.1	< 0.0005	0.01	< 0.1	5.4	< 0.005		< 0.0001	1.3	0.635		< 0.0001
20/12/2008	29																						
27/12/2008	30																						
3/01/2009	31																						
10/01/2009	32	0.0007	17.9	< 0.01	0.1	0.01	0.42	0.007		12.63	0.64	< 0.1	< 0.0005	0.03	< 0.1	2	0.007		< 0.0001	1.2	0.8444		0.0001

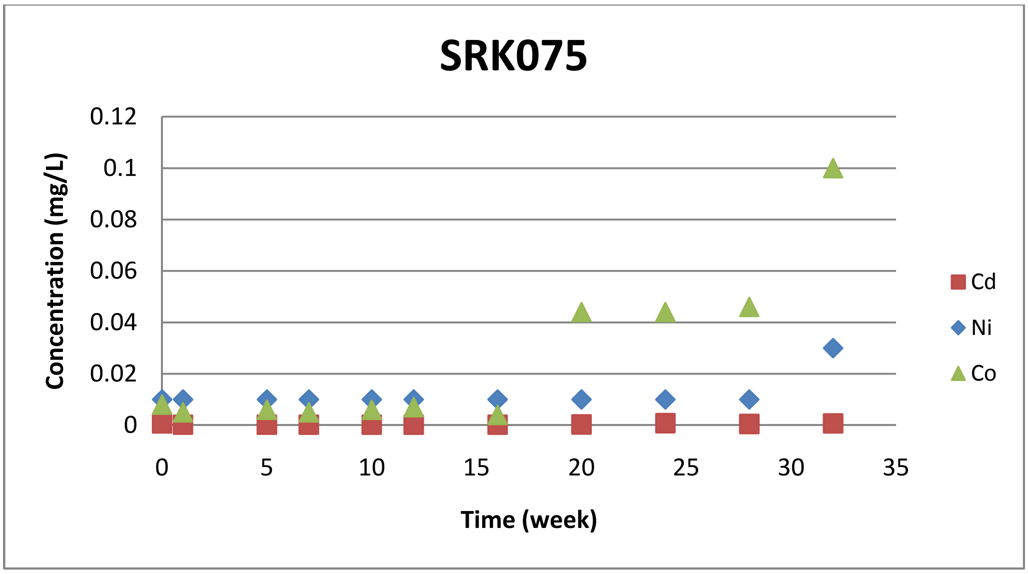
Client: AGA
Project: Tropicana
Project No: AGA001
Test: HC 1
Sample = SRK075

Date	Cycle	Sn	Ti	U	V	Zn	Zr
		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
LOD		0.00001	0.0005	0.000002	0.0002	0.0001	0.0001
31/05/2008	0	< 0.001		0.00014	< 0.01	< 0.01	
7/06/2008	1	< 0.001		0.00039	< 0.01	0.03	
14/06/2008	2						
21/06/2008	3						
5/07/2008	5	< 0.001		0.00028	< 0.01	0.04	
12/07/2008	6						
19/07/2008	7	< 0.001		0.00022	< 0.01	0.05	
26/07/2008	8						
2/08/2008	9						
9/08/2008	10	< 0.001		0.00027	< 0.01	0.03	
16/08/2008	11						
23/08/2008	12	< 0.001		0.00017	< 0.01	0.04	
30/08/2008	13						
6/09/2008	14						
13/09/2008	15						
20/09/2008	16	< 0.001		0.00028	< 0.01	0.03	
27/09/2008	17						
4/10/2008	18						
11/10/2008	19						
18/10/2008	20	< 0.001		0.00034	< 0.01	0.23	
25/10/2008	21						
1/11/2008	22						
8/11/2008	23						
15/11/2008	24	< 0.001		0.00014	< 0.01	0.21	
22/11/2008	25						
29/11/2008	26						
6/12/2008	27						
13/12/2008	28	0.002		0.00023	< 0.01	0.26	
20/12/2008	29						
27/12/2008	30						
3/01/2009	31						
10/01/2009	32	< 0.001		0.00128	< 0.01	0.55	

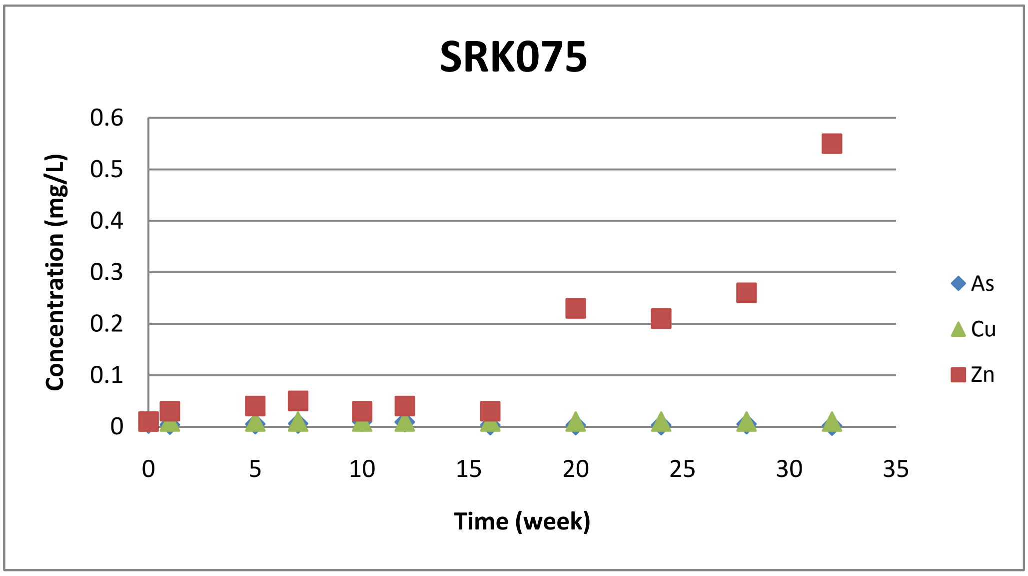

SRK075
Concentration (mg/L)
100
80
60
40
20
0
0
5
10
15
20
25
30
35
Time (week)
SO4


SRK075
Concentration (mg/L)
20
15
10
5
0
0
5
10
15
20
25
30
35
Time (week)
Ca
Mg

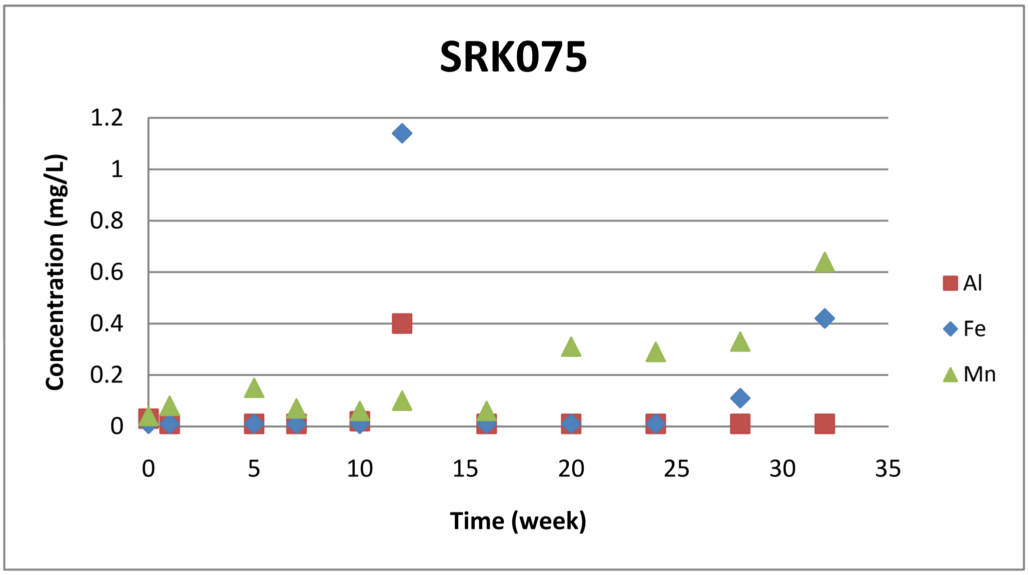

SRK075
Molar ratio
1.4
1.2
1
0.8
0.6
0.4
0.2
0
10.00
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
0
5
10
15
20
25
30
35
Time (week)
SO4/(Ca+Mg)
pH



SRK075
Concentration (mg/L)
0.12
0.1
0.08
0.06
0.04
0.02
0
0
5
10
15
20
25
30
35
Time (week)
Cd
Ni
Co



SRK075
Concentration (mg/L)
0.6
0.5
0.4
0.3
0.2
0.1
0
0
5
10
15
20
25
30
35
Time (week)
As
Cu
Zn



SRK075
Concentration (mg/L)
1.2
1
0.8
0.6
0.4
0.2
0
0
5
10
15
20
25
30
35
Time (week)
Al
Fe
Mn

Project No: AGA001
Test: HC 1
Sample = SRK077

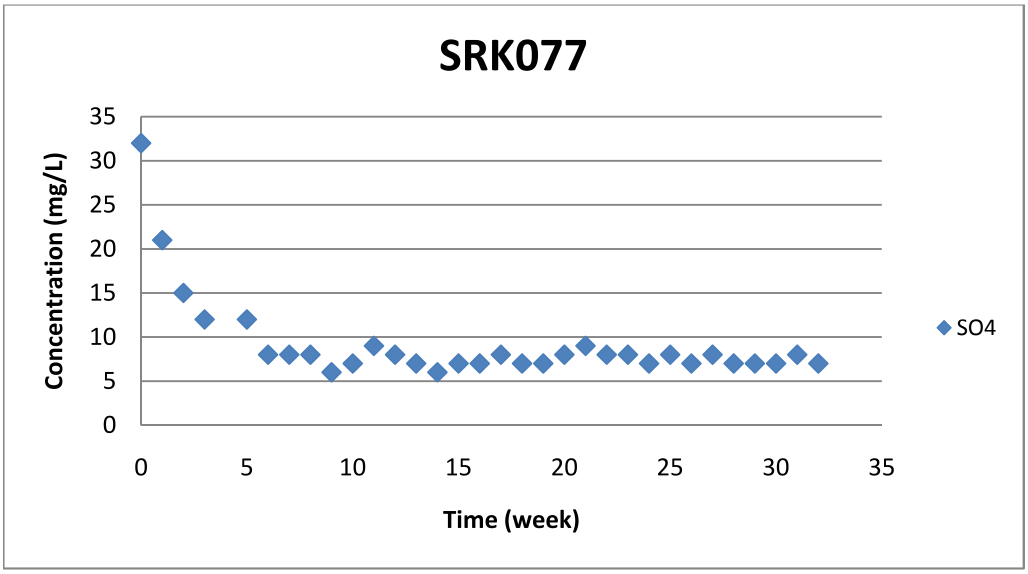
Date	Cycle	Volume mL		pH	ORP	Cond.	Acidity	Acidity	Alkalinity	Sulphate	Chloride	Fluoride	Hardness	Al	Sb	As	Ba	Be	Bi	B
		Input	Output		SHE	umhos/cm	(pH 4.5)	(pH 8.3)					CaCO3							
					mV		mgCaCO3/L	mgCaCO3/L	mgCaCO3/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
LOD		5	5	0.01	1.00	1	0.1	0.1	0.1	1	0.5	0.05	#N/A	0.0002	0.00002	0.00002	0.00002	0.00001	0.000005	0.005
31/05/2008	0	1000.00	850.00	7.20		250		< 5.0	25	32				0.07	0.006	0.007	0.3142	< 0.001		
7/06/2008	1	1000.00	840.00	7.20		170		5	19	21				< 0.01	0.0024	0.005	0.3331	< 0.001		
14/06/2008	2	1000.00	860.00	7.00		150		8	20	15										
21/06/2008	3	1000.00	860.00	7.00		130		8	19	12										
5/07/2008	5	1000.00	860.00	6.70		110		7	17	12				0.05	0.0021	0.015	0.3461	< 0.001		
12/07/2008	6	1000.00	860.00	6.60		72		7	12	8										
19/07/2008	7	1000.00	850.00	6.90		69		< 5.0	15	8				< 0.01	0.0011	0.009	0.2013	< 0.001		
26/07/2008	8	1000.00	850.00	6.80		63		< 5.0	16	8										
2/08/2008	9	1000.00	850.00	6.80		53		< 5.0	11	6										
9/08/2008	10	1000.00	850.00	6.60		68		< 5.0	10	7	6			0.02	0.0011	0.012	0.1519	< 0.001		
16/08/2008	11	1000.00	850.00	6.80		50		17	11	9										
23/08/2008	12	1000.00	850.00	6.80		49		16	11	8	4			< 0.01	0.001	0.01	0.2204	< 0.001		
30/08/2008	13	1000.00	850.00	6.40		45		8	9	7										
6/09/2008	14	1000.00	850.00	6.50		41		7	9.2	6										
13/09/2008	15	1000.00	850.00	6.40		38		5	9	7	2									
20/09/2008	16	1000.00	850.00	6.30		33		< 5.0	7	7	2			< 0.01	0.0008	0.004	0.1244	< 0.001		
27/09/2008	17	1000.00	850.00	6.60		36		< 5.0	10	8	2									
4/10/2008	18	1000.00	850.00	6.50		32		< 5.0	10	7	2									
11/10/2008	19	1000.00	850.00	6.60		33		< 5.0	10	7	2									
18/10/2008	20	1000.00	850.00	6.70		33		< 5.0	10	8	2			< 0.01	0.0008	0.008	0.1731	< 0.001		
25/10/2008	21	1000.00	850.00	6.70		29		6	7	9	1									
1/11/2008	22	1000.00	850.00	6.80		37		5	10	8	2									
8/11/2008	23	1000.00	850.00	6.80		50		5	7	8	6									
15/11/2008	24	1000.00	850.00	6.80		55		5	10	7	8			< 0.01	0.0009	0.005	0.2197	< 0.001		
22/11/2008	25	1000.00	850.00	6.80		34		< 5.0	8	8	2									
29/11/2008	26	1000.00	850.00	6.50		32		< 5.0	9.5	7	2									
6/12/2008	27	1000.00	850.00	6.50		37		7	7	8	3									
13/12/2008	28	1000.00	850.00	6.40		31		5	7	7	2			0.01	0.0007	0.008	0.1398	0.001		
20/12/2008	29	1000.00	850.00	6.50		30		< 5.0	7	7	1									
27/12/2008	30	1000.00	850.00	6.30		30		< 5.0	< 5.0	7	1									
3/01/2009	31	1000.00	850.00	6.20		240		< 5.0	7	8	1									
10/01/2009	32	1000.00	850.00	6.20		31		< 5.0	7	7	1			< 0.01	0.0006	< 0.001	0.2	< 0.001		

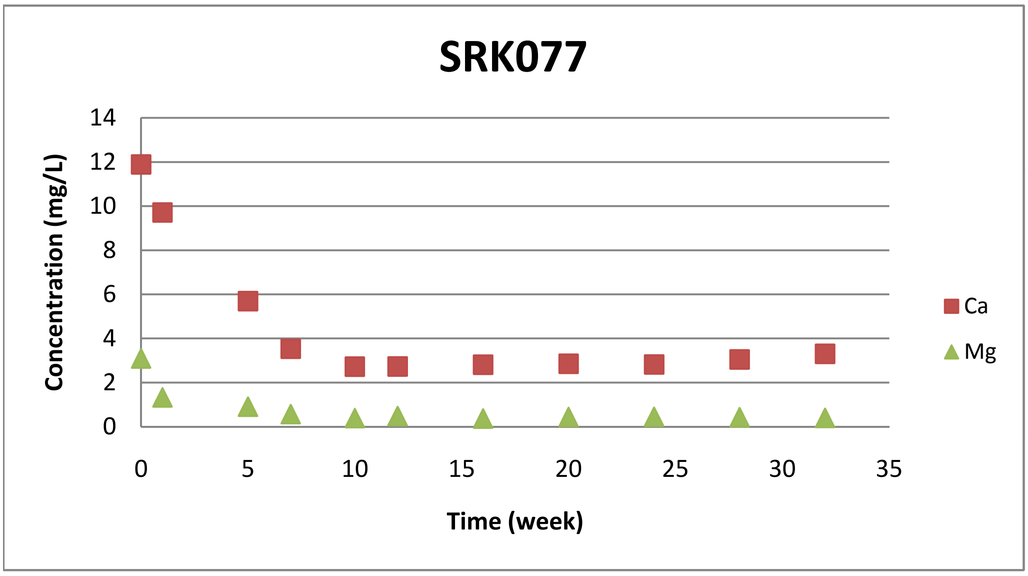
Project No: AGA001
Test: HC 1
Sample = SRK077

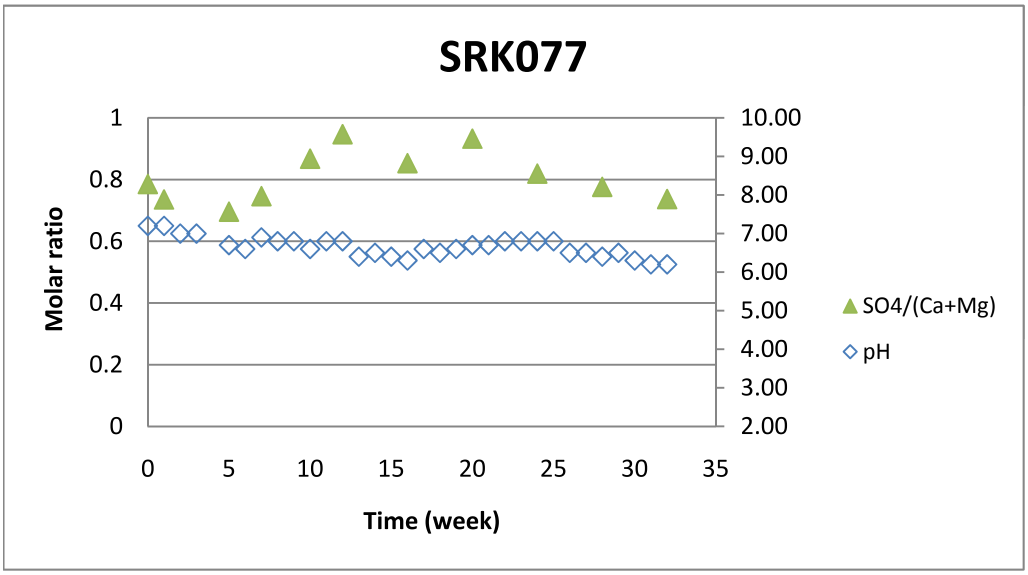
Date	Cycle	Cd	Ca	Cr	Co	Cu	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl
		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
LOD		0.000005	0.05	0.0001	0.000005	0.00005	0.001	0.000005	0.0005	0.05	0.00005	0.01	0.00005	0.00002	0.002	0.05	0.00004	0.1	0.000005	0.05	5E-05	3	0.000002
31/05/2008	0	0.0008	11.89	< 0.01	0.005	< 0.01	< 0.01	< 0.005		3.09	0.03	< 0.1	0.0158	< 0.01	< 0.1	8.8	0.01		< 0.0001		2.9532		0.0002
7/06/2008	1	0.0004	9.71	< 0.01	0.002	< 0.01	< 0.01	< 0.005		1.33	0.09	< 0.1	0.0077	< 0.01	< 0.1	2.4	0.007		< 0.0001		2.22		0.0001
14/06/2008	2																						
21/06/2008	3																						
5/07/2008	5	0.0002	5.69	< 0.01	0.001	< 0.01	< 0.01	0.009		0.91	0.07	< 0.1	0.0054	< 0.01	< 0.1	2.1	< 0.005		0.0001		1.1399		0.0001
12/07/2008	6																						
19/07/2008	7	< 0.0002	3.53	< 0.01	< 0.001	< 0.01	< 0.01	< 0.005		0.57	0.05	< 0.1	0.004	< 0.01	< 0.1	1.3	< 0.005		< 0.0001		0.6151		0.0001
26/07/2008	8																						
2/08/2008	9																						
9/08/2008	10	0.0002	2.72	< 0.01	< 0.001	< 0.01	< 0.01	< 0.005		0.39	0.04	< 0.1	0.0036	< 0.01	< 0.1	1.2	0.005		< 0.0001	6.3	0.4837		< 0.0001
16/08/2008	11																						
23/08/2008	12	< 0.0002	2.73	< 0.01	< 0.001	< 0.01	0.1	0.007		0.48	0.04	< 0.1	0.0032	< 0.01	< 0.1	1.1	< 0.005		< 0.0001	5.4	0.4828		< 0.0001
30/08/2008	13																						
6/09/2008	14																						
13/09/2008	15																						
20/09/2008	16	< 0.0002	2.81	< 0.01	< 0.001	< 0.01	< 0.01	< 0.005		0.37	0.03	< 0.1	0.0027	< 0.01	< 0.1	1.1	< 0.005		< 0.0001	2.9	0.6099		< 0.0001
27/09/2008	17																						
4/10/2008	18																						
11/10/2008	19																						
18/10/2008	20	< 0.0002	2.85	< 0.01	< 0.001	< 0.01	< 0.01	< 0.005		0.44	0.03	< 0.1	0.0033	< 0.01	< 0.1	1.2	< 0.005		< 0.0001	2.5	0.6629		< 0.0001
25/10/2008	21																						
1/11/2008	22																						
8/11/2008	23																						
15/11/2008	24	0.0006	2.82	< 0.01	0.001	< 0.01	< 0.01	< 0.005		0.45	0.03	< 0.1	0.0034	< 0.01	< 0.1	8.7	< 0.005		< 0.0001	2.2	0.6179		< 0.0001
22/11/2008	25																						
29/11/2008	26																						
6/12/2008	27																						
13/12/2008	28	0.0002	3.05	< 0.01	< 0.001	< 0.01	< 0.01	< 0.005		0.43	0.02	< 0.1	0.0026	< 0.01	< 0.1	1.3	< 0.005		< 0.0001	2.3	0.5648		< 0.0001
20/12/2008	29																						
27/12/2008	30																						
3/01/2009	31																						
10/01/2009	32	< 0.0002	3.3	< 0.01	< 0.001	< 0.01	< 0.01	< 0.005		0.4	0.02	< 0.1	0.0039	< 0.01	< 0.1	1.4	< 0.005		< 0.0001	1.9	0.6657		0.0001

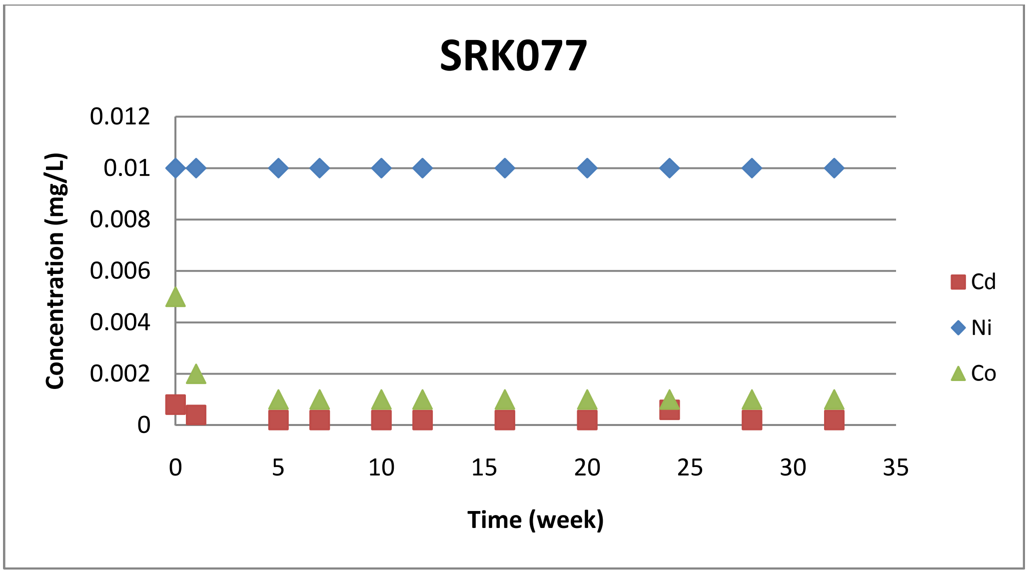
Project No: AGA001
Test: HC 1
Sample = SRK077

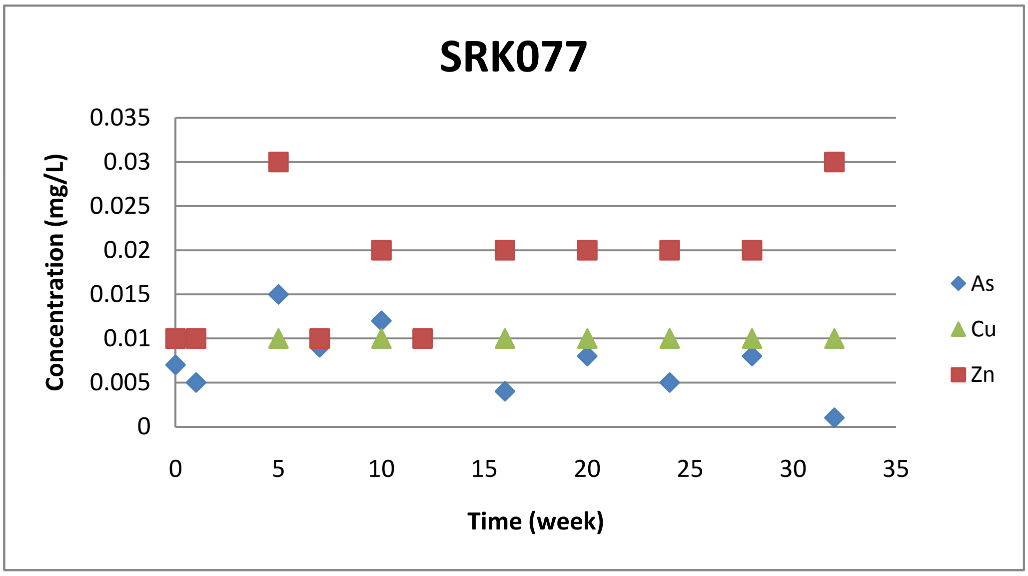
Date	Cycle	Sn	Ti	U	V	Zn	Zr
		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
LOD		0.00001	0.0005	0.000002	0.0002	0.0001	0.0001
31/05/2008	0	< 0.001		0.00336	< 0.01	< 0.01	
7/06/2008	1	< 0.001		0.00832	< 0.01	< 0.01	
14/06/2008	2						
21/06/2008	3						
5/07/2008	5	< 0.001		0.01146	< 0.01	0.03	
12/07/2008	6						
19/07/2008	7	< 0.001		0.00735	< 0.01	< 0.01	
26/07/2008	8						
2/08/2008	9						
9/08/2008	10	< 0.001		0.00747	< 0.01	0.02	
16/08/2008	11						
23/08/2008	12	< 0.001		0.00774	< 0.01	0.01	
30/08/2008	13						
6/09/2008	14						
13/09/2008	15						
20/09/2008	16	< 0.001		0.00482	< 0.01	0.02	
27/09/2008	17						
4/10/2008	18						
11/10/2008	19						
18/10/2008	20	< 0.001		0.00433	< 0.01	0.02	
25/10/2008	21						
1/11/2008	22						
8/11/2008	23						
15/11/2008	24	< 0.001		0.0036	< 0.01	0.02	
22/11/2008	25						
29/11/2008	26						
6/12/2008	27						
13/12/2008	28	< 0.001		0.00375	< 0.01	0.02	
20/12/2008	29						
27/12/2008	30						
3/01/2009	31						
10/01/2009	32	< 0.001		0.0027	< 0.01	0.03	

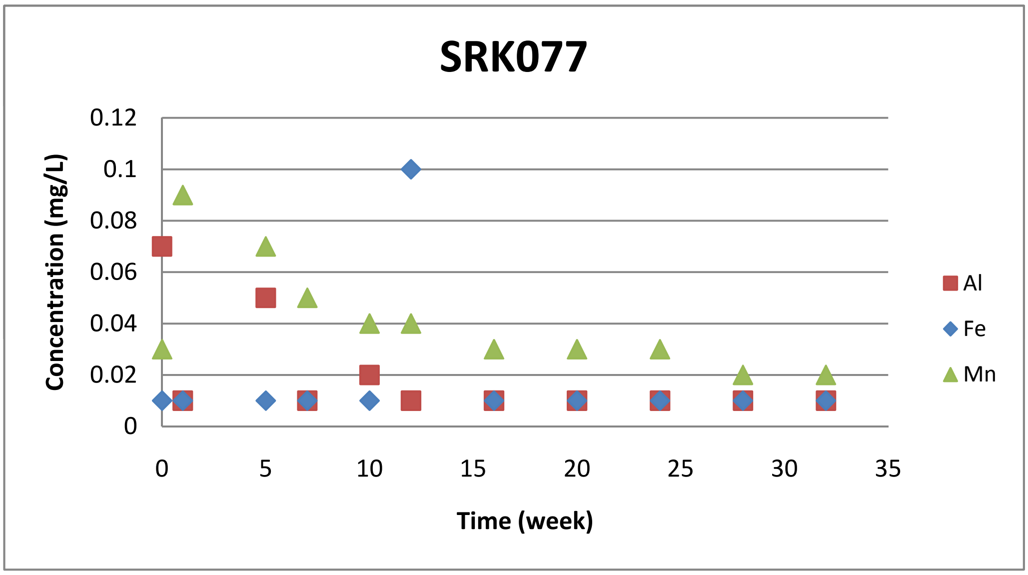

SRK077
Concentration (mg/L)
35
30
25
20
15
10
5
0
0
5
10
15
20
25
30
35
Time (week)
SO4


SRK077
Concentration (mg/L)
14
12
10
8
6
4
2
0
0
5
10
15
20
25
30
35
Time (week)
Ca
Mg


SRK077
Molar ratio
1
0.8
0.6
0.4
0.2
0
10.00
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
0
5
10
15
20
25
30
35
Time (week)
SO4/(Ca+Mg)
pH


SRK077
Concentration (mg/L)
0.012
0.01
0.008
0.006
0.004
0.002
0
0
5
10
15
20
25
30
35
Time (week)
Cd
Ni
Co


SRK077
Concentration (mg/L)
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
0
5
10
15
20
25
30
35
Time (week)
As
Cu
Zn


SRK077
Concentration (mg/L)
0.12
0.1
0.08
0.06
0.04
0.02
0
0
5
10
15
20
25
30
35
Time (week)
Al
Fe
Mn

Client: AGA
Project: Tropicana
Project No: AGA001
Test: HC 1
Sample = SRK088

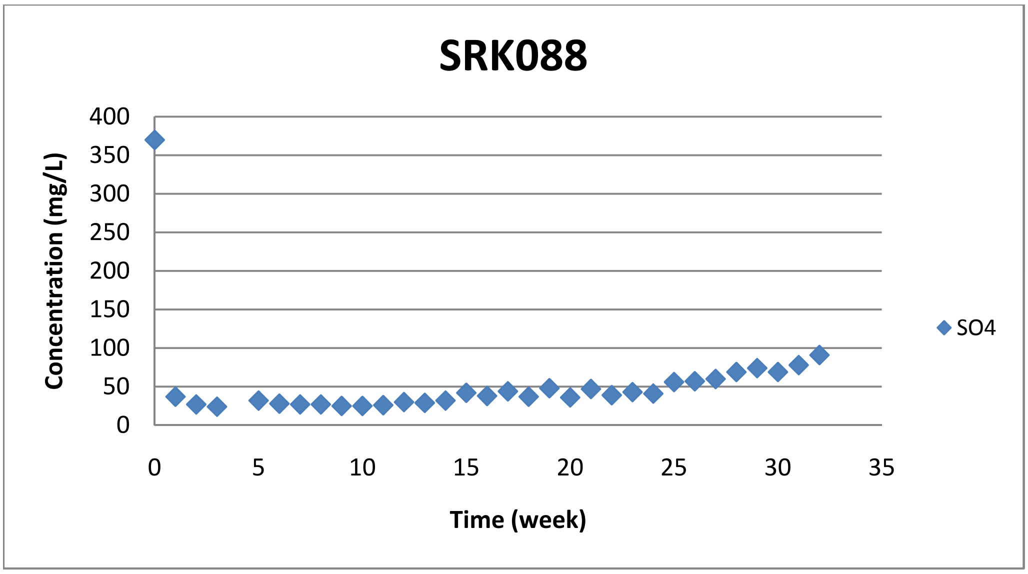
Date	Cycle	Volume mL		pH	ORP	Cond.	Acidity	Acidity	Alkalinity	Sulphate	Chloride	Fluoride	Hardness	Al	Sb	As	Ba	Be	Bi	B
		Input	Output		SHE	umhos/cm	(pH 4.5)	(pH 8.3)					CaCO3							
					mV		mgCaCO3/L	mgCaCO3/L	mgCaCO3/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
LOD		5	5	0.01	1.00	1	0.1	0.1	0.1	1	0.5	0.05	#N/A	0.0002	0.00002	0.00002	0.00002	0.00001	0.000005	0.005
31/05/2008	0	1000.00	1500.00	7.70		1200		< 5.0	51	370				0.04	0.0042	0.061	0.2226	< 0.001		
7/06/2008	1	1000.00	690.00	7.70		290		7	53	37				0.06	0.0051	0.022	0.0532	< 0.001		
14/06/2008	2	1000.00	680.00	7.80		210		7	56	27										
21/06/2008	3	1000.00	670.00	7.80		190		7	59	24										
5/07/2008	5	1000.00	660.00	7.70		230		7	61	32				0.18	0.007	0.053	0.045	< 0.001		
12/07/2008	6	1000.00	640.00	7.60		200		8	54	28										
19/07/2008	7	1000.00	680.00	7.80		180		< 5.0	52	27				0.1	0.0041	0.039	0.0324	< 0.001		
26/07/2008	8	1000.00	660.00	7.70		190		< 5.0	60	27										
2/08/2008	9	1000.00	660.00	7.70		180		< 5.0	47	25										
9/08/2008	10	1000.00	680.00	7.70		180		< 5.0	45	25	6			0.13	0.0036	0.048	0.0312	< 0.001		
16/08/2008	11	1000.00	660.00	7.80		160		13	46	26										
23/08/2008	12	1000.00	660.00	7.80		180		12	48	30	4			0.14	0.0034	0.051	0.03	< 0.001		
30/08/2008	13	1000.00	660.00	7.40		190		< 5.0	43	29										
6/09/2008	14	1000.00	660.00	7.40		200		7	43	32										
13/09/2008	15	1000.00	660.00	7.40		180		< 5.0	42	42	5									
20/09/2008	16	1000.00	660.00	7.40		160		< 5.0	43	38	6			0.13	0.0028	0.042	0.0323	< 0.001		
27/09/2008	17	1000.00	660.00	7.40		170		< 5.0	43	44	2									
4/10/2008	18	1000.00	660.00	7.60		160		< 5.0	42	37	2									
11/10/2008	19	1000.00	660.00	7.20		180		< 5.0	35	48	4									
18/10/2008	20	1000.00	660.00	7.90		170		5	52	36	4			0.14	0.0027	0.061	0.0486	< 0.001		
25/10/2008	21	1000.00	660.00	7.70		180		< 5.0	47	47	3									
1/11/2008	22	1000.00	660.00	7.50		150		< 5.0	33	39	3									
8/11/2008	23	1000.00	660.00	7.60		190		5	40	43	8									
15/11/2008	24	1000.00	660.00	7.70		210		6	42	41	11			0.12	0.0025	0.051	0.0454	< 0.001		
22/11/2008	25	1000.00	660.00	7.60		180		< 5.0	37	56	3									
29/11/2008	26	1000.00	660.00	7.10		200		< 5.0	37	57	2									
6/12/2008	27	1000.00	670.00	7.00		220		5	37	60	7									
13/12/2008	28	1000.00	660.00	6.90		220		5	30	69	6			0.14	0.0019	0.062	0.0411	0.001		
20/12/2008	29	1000.00	660.00	7.00		260		< 5.0	37	74	8									
27/12/2008	30	1000.00	660.00	7.00		220		< 5.0	40	69	3									
3/01/2009	31	1000.00	660.00	7.00		820		< 5.0	40	78	3									
10/01/2009	32	1000.00	660.00	6.90		300		< 5.0	36	91	13			0.12	0.0021	0.051	0.0569	< 0.001		

Client: AGA
Project: Tropicana
Project No: AGA001
Test: HC 1
Sample = SRK088

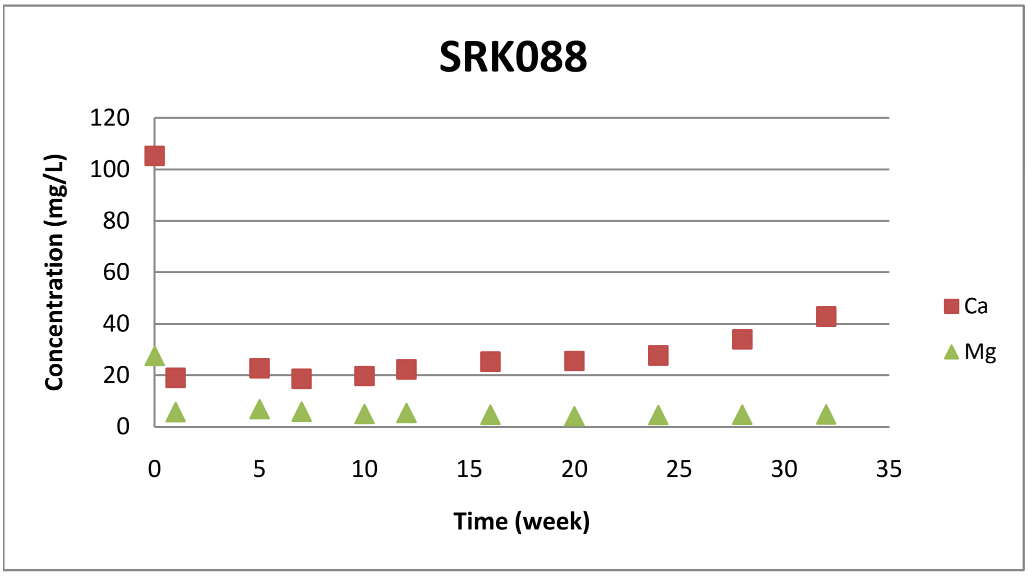
Date	Cycle	Cd	Ca	Cr	Co	Cu	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl
		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
LOD		0.000005	0.05	0.0001	0.000005	0.00005	0.001	0.000005	0.0005	0.05	0.00005	0.01	0.00005	0.00002	0.002	0.05	0.00004	0.1	0.000005	0.05	5E-05	3	0.000002
31/05/2008	0	0.0017	105.25	< 0.01	0.006	< 0.01	< 0.01	< 0.005		27.5	0.04	< 0.1	0.6733	< 0.01	< 0.1	58.5	0.054		0.0011		3.4009		< 0.0001
7/06/2008	1	< 0.0002	18.98	< 0.01	0.001	< 0.01	< 0.01	< 0.005		5.67	< 0.01	< 0.1	0.8148	< 0.01	< 0.1	18.5	0.016		0.0007		0.6919		< 0.0001
14/06/2008	2																						
21/06/2008	3																						
5/07/2008	5	< 0.0002	22.69	< 0.01	< 0.001	< 0.01	< 0.01	< 0.005		6.86	< 0.01	< 0.1	0.1836	< 0.01	< 0.1	15.6	0.008		0.0008		0.6274		< 0.0001
12/07/2008	6																						
19/07/2008	7	< 0.0002	18.6	< 0.01	< 0.001	< 0.01	< 0.01	< 0.005		5.86	< 0.01	0.1	0.0925	< 0.01	< 0.1	9.4	0.007		0.0009		0.4993		< 0.0001
26/07/2008	8																						
2/08/2008	9																						
9/08/2008	10	0.0002	19.68	< 0.01	0.002	< 0.01	< 0.01	0.013		4.95	< 0.01	0.1	0.062	< 0.01	< 0.1	7.6	0.012		0.0022	2.2	0.4565		< 0.0001
16/08/2008	11																						
23/08/2008	12	< 0.0002	22.26	< 0.01	< 0.001	< 0.01	0.04	< 0.005		5.36	< 0.1	< 0.1	0.0522	< 0.01	< 0.1	7.3	0.013		0.0009	2.2	0.4927		< 0.0001
30/08/2008	13																						
6/09/2008	14																						
13/09/2008	15																						
20/09/2008	16	< 0.0002	25.25	< 0.01	< 0.001	< 0.01	< 0.01	< 0.005		4.7	0.01	< 0.1	0.0377	< 0.01	< 0.1	7.9	0.012		0.0023	2.2	0.5555		< 0.0001
27/09/2008	17																						
4/10/2008	18																						
11/10/2008	19																						
18/10/2008	20	< 0.0002	25.53	< 0.01	< 0.001	< 0.01	< 0.01	< 0.005		4.11	0.01	< 0.1	0.0335	< 0.01	0.1	7.3	0.013		0.0008	1.9	0.5919		< 0.0001
25/10/2008	21																						
1/11/2008	22																						
8/11/2008	23																						
15/11/2008	24	0.0007	27.7	< 0.01	< 0.001	< 0.01	< 0.01	< 0.005		4.54	< 0.01	0.1	0.0313	< 0.01	0.2	15.4	0.012		0.0002	1.5	0.5983		< 0.0001
22/11/2008	25																						
29/11/2008	26																						
6/12/2008	27																						
13/12/2008	28	0.0004	33.93	< 0.01	< 0.001	< 0.01	< 0.01	< 0.005		4.68	0.01	0.5	0.0344	< 0.01	0.1	12.2	0.011		0.0011	1.8	0.609		< 0.0001
20/12/2008	29																						
27/12/2008	30																						
3/01/2009	31																						
10/01/2009	32	< 0.0002	42.81	< 0.01	0.003	< 0.01	0.25	< 0.005		4.78	0.03	0.1	0.0453	< 0.01	< 0.10	15.3	0.012		0.0012	2.2	0.8044		0.0002

Client: AGA
Project: Tropicana
Project No: AGA001
Test: HC 1
Sample = SRK088

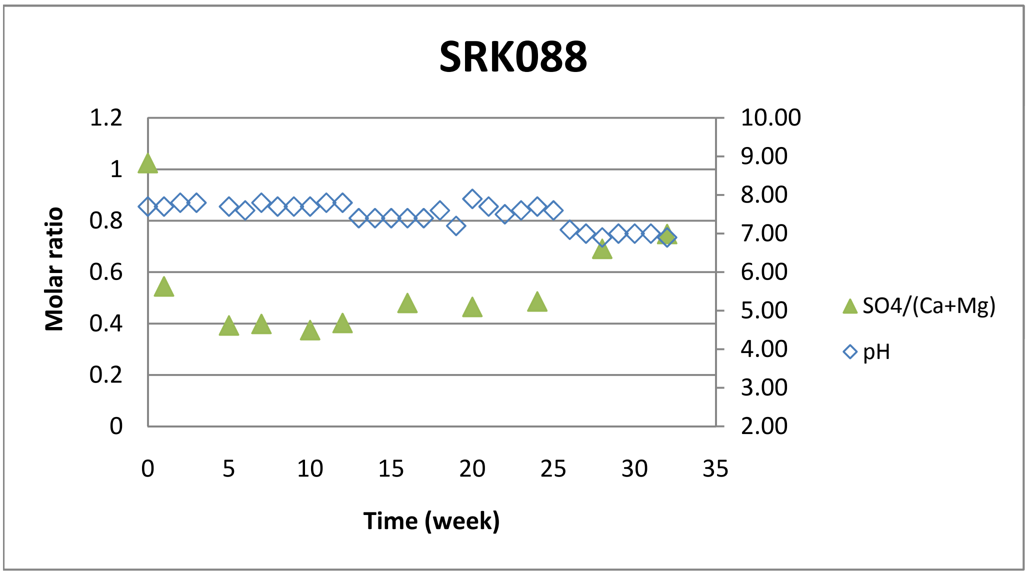
Date	Cycle	Sn	Ti	U	V	Zn	Zr
		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
LOD		0.00001	0.0005	0.000002	0.0002	0.0001	0.0001
31/05/2008	0	< 0.001		0.0014	< 0.01	< 0.01	
7/06/2008	1	< 0.001		0.00049	< 0.01	< 0.01	
14/06/2008	2						
21/06/2008	3						
5/07/2008	5	< 0.001		0.00098	< 0.01	0.02	
12/07/2008	6						
19/07/2008	7	< 0.001		0.00101	< 0.01	< 0.01	
26/07/2008	8						
2/08/2008	9						
9/08/2008	10	< 0.001		0.00146	< 0.01	0.01	
16/08/2008	11						
23/08/2008	12	< 0.001		0.00177	< 0.01	< 0.01	
30/08/2008	13						
6/09/2008	14						
13/09/2008	15						
20/09/2008	16	< 0.001		0.0021	< 0.01	< 0.01	
27/09/2008	17						
4/10/2008	18						
11/10/2008	19						
18/10/2008	20	< 0.001		0.002	< 0.01	0.03	
25/10/2008	21						
1/11/2008	22						
8/11/2008	23						
15/11/2008	24	< 0.001		0.00222	< 0.01	0.03	
22/11/2008	25						
29/11/2008	26						
6/12/2008	27						
13/12/2008	28	< 0.001		0.002	< 0.01	0.02	
20/12/2008	29						
27/12/2008	30						
3/01/2009	31						
10/01/2009	32	< 0.001		0.00189	< 0.01	0.04	



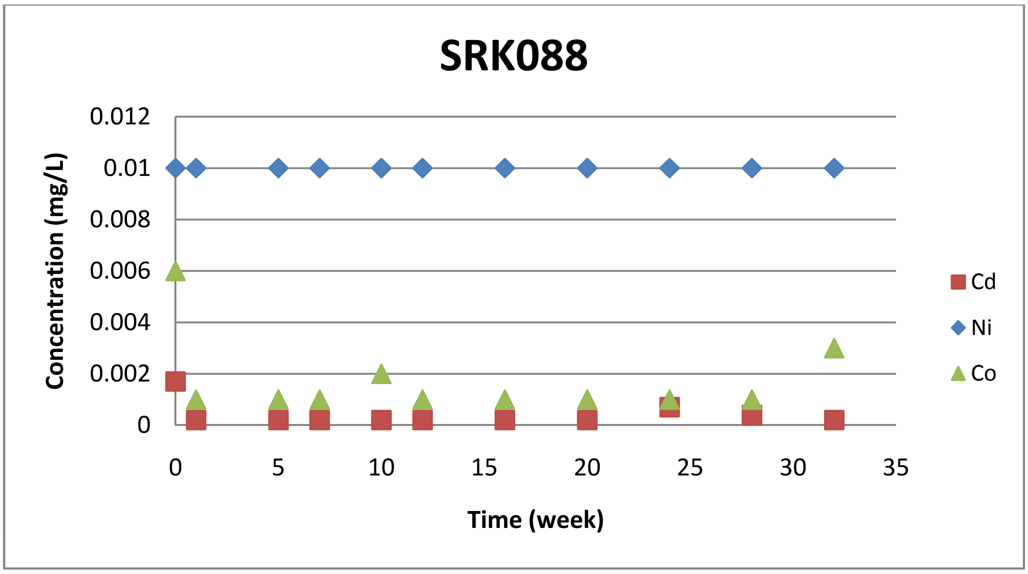
SRK088
Concentration (mg/L)
400
350
300
250
200
150
100
50
0
0
5
10
15
20
25
30
35
Time (week)
SO4

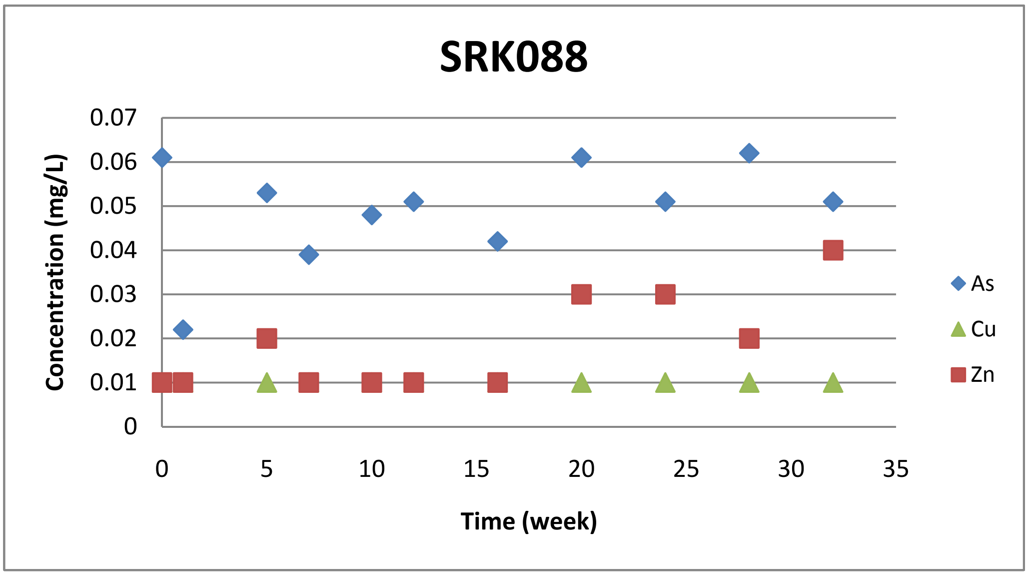


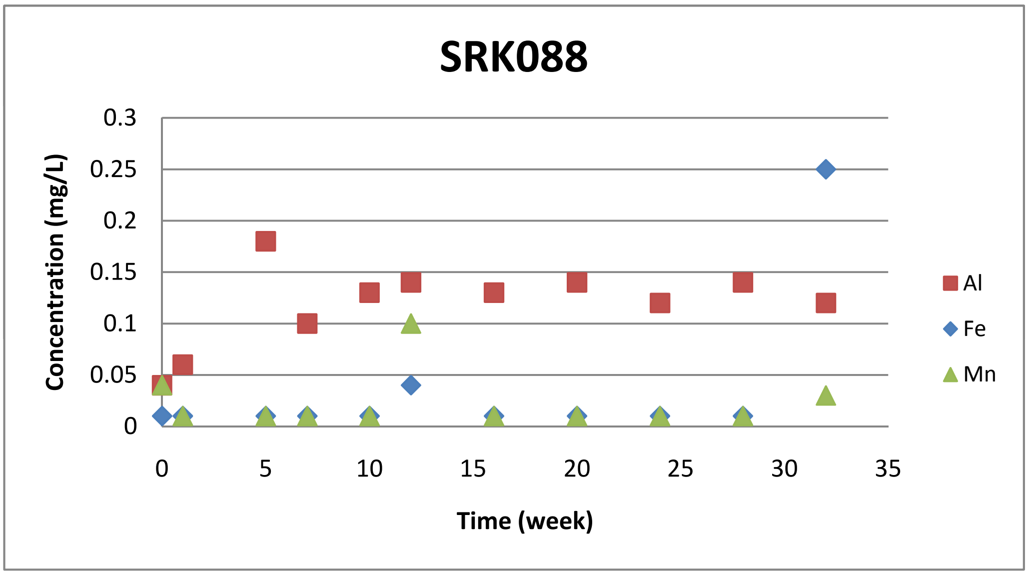
SRK088
Concentration (mg/L)
120
100
80
60
40
20
0
0
5
10
15
20
25
30
35
Time (week)
Ca
Mg



SRK088
Molar ratio
1.2
1
0.8
0.6
0.4
0.2
0
10.00
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
0
5
10
15
20
25
30
35
Time (week)
SO4/(Ca+Mg)
pH


SRK088
Concentration (mg/L)
0.012
0.01
0.008
0.006
0.004
0.002
0
0
5
10
15
20
25
30
35
Time (week)
Cd
Ni
Co


SRK088
Concentration (mg/L)
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
0
5
10
15
20
25
30
35
Time (week)
As
Cu
Zn


SRK088
Concentration (mg/L)
0.3
0.25
0.2
0.15
0.1
0.05
0
0
5
10
15
20
25
30
35
Time (week)
Al
Fe
Mn

SRK Report Distribution Record

Ref:	AGA001
Copy No:	Electronic
Date:	8 July 2009

Name/Title	Company	Copy #
Belinda Bastow	AngloGold Ashanti Australia	1

Approval Signature:	

Rev No.	Date	Revised By	Revision Details
A	6-11-08	Alex Watson	Compilation of Round B Phase 1
B	7-11-08	Andrew Garvie	Peer Review
C	7-11-08	Doris Kaminski	QA/QC on formatting
D	10-11-08	Claire Linklater / Alex Watson	Peer review Additional changes to Report
0	11-11-08	Doris Kaminski	QA/QC on Draft Report formatting and ready to be issued to client
1	11-05-2009	John Chapman	Addressed comments from AGAA
1	11-05-2009	John Chapman	Finalised comments from AGAA

SRK Report Distribution Record

Ref:	AGA001
Copy No:	Electronic
Date:	10 July 2009

Name/Title	Company	Copy #
Belinda Bastow	AngloGold Ashanti Australia	1

Approval Signature:	

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0	11-11-08	Doris Kaminski	QA/QC on Draft Report formatting and ready to be issued to client
1	11-05-2009	John Chapman	Addressed comments from AGAA
1	11-05-2009	John Chapman	Finalised comments from AGAA
2	10-0702009	John Chapman	Corrected errors in tables