

Appendix V3-4A

Geochemical Characterization of Tailings from the
Madrid North, Madrid South and Boston Deposits,
Hope Bay Project





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Prepared for

TMAC Resources Inc.



Prepared by



SRK Consulting (Canada) Inc.

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Technical Summary

This report documents the methods and results of the geochemical testing program for metallurgical tailings from Madrid North, Madrid South and Boston to assess the metal leaching and acid rock drainage (ML/ARD) potential of tailings that would be produced as part of the proposed underground mining activities for the Hope Bay Project (the Project). The findings are based on acid-base accounting, trace element, mineralogy data, process water chemistry, and results from humidity cell, saturated column and aging tests on metallurgical tailings produced from 2008 to 2010.

Three types of tailings were included in the characterization program: flotation tailings, detoxified tailings and mixed tailings. Mixed tailings are a combined tailings product comprised of flotation and detoxified tailings. TMAC plans to use the detoxified tailings as backfill in the underground mine workings, and to deposit flotation tailings in tailings areas at Doris and Boston. Therefore, under the current mine plan, there will be no mixed tailings. Results from the mixed tailings have been included in this report for completeness; however, the focus of this summary is on the geochemical characteristics of the tailings streams that will be managed as part of the Project.

ARD classifications were related to tailings types with flotation tailings classified as non-PAG and detoxified tailings as PAG. Sulphur content was also related to tailings type with total sulphur content higher in the detoxified tailings. For the flotation tailings only, sulphur levels were also related to deposit area, with sulphur content for Madrid South typically lower than Boston, which was lower than Madrid North. Pyrite was the primary sulphide mineral in all tailings types from all deposit areas. Trace sulphide mineralogy for the Madrid North tailings samples determined that gersdorffite was present in all tailings types, with chalcopyrite, millerite, and pyrhotite present in the detoxified tailings.

There is no kinetic test data available for Madrid South. Boston was determined to be the most geochemically appropriate and conservative geochemical analog for Madrid South flotation tailings. For Madrid South detoxified tailings, Boston or Madrid North samples are appropriate analogs.

The pH of all humidity cell tests remained neutral to alkaline for the duration of the tests. A humidity cell test containing detoxified tailings from Doris is the only sample from the Project to develop acidic conditions, and did so almost four years into operation (SRK 2015).

Arsenic leaching is the primary metal leaching concern for both Madrid North and Boston and was highest for Madrid North flotation tailings. Arsenic leaching was not related to tailings type, sulphide content or arsenic content. Results from the Hope Bay waste rock humidity cell test program (e.g. SRK 2016c) suggested a relationship between arsenic leaching and the presence of the trace sulphide mineral gersdorffite. Gersdorffite was identified at trace levels in all Madrid North tailings samples suggesting that this may also be a control on arsenic leaching. Trace mineralogical data were not available for the Boston samples.

Sulphate, cobalt, manganese, nickel and selenium appear to be related to tailings type, with rates from detoxified tailings greater than flotation tailings, suggesting that leaching is controlled by

sulphide content. Leaching of cobalt and manganese was typically higher for Madrid North than Boston.

Cyanide is a reagent additive that is part of the milling process thus explaining the presence of total and weak acid dissociable (WAD) cyanide in the detoxified tailings process water only. Decreases in total and WAD cyanide were observed over the duration of both the oxic and anoxic tests indicating degradation of residual cyanide in the samples. Ammonia is a degradation product of cyanide thus explaining the elevated ammonia levels in the mixed tailings and detoxified tailings process water.

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1 Introduction

The Hope Bay Project (the Project) is a gold mining and milling undertaking of TMAC Resources Inc. The Project is located 705 km northeast of Yellowknife and 153 km southwest of Cambridge Bay in Nunavut Territory, and is situated east of Bathurst Inlet. The Project comprises three distinct areas of known mineralization plus extensive exploration potential and targets. The three areas that host mineral resources are Doris, Madrid, and Boston.

The Project consists of two phases: Phase 1 (Doris project), which is currently being carried out under an existing Water Licence, and Phase 2 which is in the environmental assessment stage. Phase 1 includes mining and infrastructure at Doris only, while Phase 2 includes mining and infrastructure at Madrid (Madrid North and Madrid South mines) and Boston (Boston Mine) located approximately 10 and 60 km south from the Doris Mine, respectively (Figure 1.1).

At the request of TMAC, SRK has prepared this report to present the methods and results for the geochemical testing program for metallurgical tailings from Madrid North, Madrid South and Boston to assess the metal leaching and acid rock drainage (ML/ARD) potential of tailings that would be produced as part of the proposed underground mining activities for the Project. The findings are based on acid-base accounting, trace element, and mineralogy data, process water chemistry, and results from humidity cell, saturated column and aging tests on metallurgical tailings produced from 2008 to 2010. The Madrid South data set is limited to static test data for flotation and detoxified tailings samples. On the basis of the tailings geochemistry database for the Project, geochemical analogs for Madrid South are suggested in this report. Source terms are presented in SRK (2016a).



Figure 1.1: Geology of Hope Bay Belt and Location of the Main Deposits

2 Overview of Tailings Characterization Program

TMAC acquired Hope Bay in early 2013 from Hope Bay Mining Ltd. (HBML) a wholly owned subsidiary of Newmont Mining. The previous owner, HBML, with assistance from SRK Consulting (Canada) Inc., completed a comprehensive geochemical characterization program of metallurgical tailings from the Madrid North (Naartok West, Naartok East and Suluk ore zones) Madrid South (Patch ore zone) and Boston (Main ore zone) deposits. The characterization work was in support of ongoing feasibility, environmental assessment and permitting studies.

The characterization program for metallurgical tailings from Madrid North and Boston included mineralogical analysis, static tests, kinetic tests, subaqueous column tests and aging tests on three separate tailings products: bulk flotation tailings, detoxified tailings (after cyanide leaching of ore concentrates)¹ and mixed tailings that represent a combination of bulk flotation tailings and detoxified tailings. In addition to the tailings samples generated by NMS, a Boston flotation tailings sample was generated by the previous owner Miramar Hope Bay Ltd. (Miramar).

Due to the Project being put on hold by HBML in 2012, the Madrid South metallurgical program did not advance from bench scale to pilot plant scale, the latter from which sufficient tailings sample quantities are produced for kinetic testing, e.g. humidity cell tests etc. Accordingly, the Madrid South data set is limited to static data for flotation and detoxified tailings samples.

TMAC plans to use the detoxified tailings as backfill in the underground mine workings, and to deposit flotation tailings in tailings areas at Doris and Boston. Therefore, under the current mine plan, there will be no mixed tailings. However, results from the mixed tailings were used for some aspects of the water quality predictions, and are therefore included for completeness.

Table 2.1 provides an inventory of samples and geochemical test work that are within the scope of the Madrid North, Madrid South and Boston tailings geochemical characterization program including the various metallurgical studies relating to each tailings sample and the proponent responsible for the metallurgical program. The testing program was developed in close collaboration with Newmont Metallurgical Services (NMS), and NMS was responsible for implementation. SRK was responsible for interpretation and reporting of the results.

¹ These were assigned various names in different phases of testing, and may be identified as cyanide or CND residues in original lab files and/or the report appendices.

Table 2.1: Inventory of Madrid N, Madrid S and Boston Tailings Samples and Geochemical Testwork

Mine	Tailings Type	Ore Zone	ABA	Humidity Cell / Column ID	Mineralogy			Process Water	Aging Test	Other ID	Proponent	Metallurgical Reference	
					XRD	MLA	SEM						
Madrid North	Flotation	Naartok West	√	HC-56 / SAD-1	√	√	√	√	√	NW-BFT-1,Dry	HBML	NMS (2010a)	
		Naartok East	√					√	√	Naartok East Bulk Floatation Tails Cantest K0011463	HBML	NMS (2010a)	
					√						NE-BFT-dry	HBML	NMS (2010a)
		Suluk	√					√	√	Suluk	HBML	NMS (2010a)	
					√						Suluk dry	HBML	NMS (2010a)
	Composite ⁴	√	HC-14	√		√				Suluk, Nartok E,W:40,30,30 %	HBML	NMS (2010a)	
	Detoxified tailings	Naartok West	√	HC-58	√	√	√			NW CNDT SS 20100602 after KP	HBML	NMS (2010a)	
					√						Naartok West, Residue 2	HBML	NMS (2010a)
		Naartok East			√						Naartok East, Residue 2	HBML	NMS (2010a)
			Suluk			√						Suluk, Residue 2	HBML
Mixed ¹		√	HC-59	√	√	√	√	√	NW-MT-SS-0-20100609	HBML	NMS (2010a)		
Madrid South	Flotation	Patch 14	√							MP14 T19-74-1 RTB ABA (172195)	HBML	NMS (2010b)	
			√								MP14 T19-74-4 RTB ABA (172198)	HBML	NMS (2010b)
			√								MP14 T19-74-5 RTB ABA (172199)	HBML	NMS (2010b)
			√								MP14 T19-74-6 RTB ABA (172200)	HBML	NMS (2010b)
			√								P14 BFT Solids ABA Maxxam	HBML	CSM (2012)
	Detoxified Tailings ²		√								179048	HBML	NMS (2010b)
			√								179049	HBML	NMS (2010b)
			√								179050	HBML	NMS (2010b)
Boston	Flotation		√	HC-13 / SAD-3	√		√	√	√	Boston Flotation Tailings	Miramar	PRA (2008b)	
					√						B-BFT-1, Dry	HBML	NMS (2010a)
					√						Boston Float Tail	HBML	NMS (2010a)
	Detoxified Tailings		√	HC-2	√			√	√		Boston CND RES	HBML	NMS (2010a)
					√						Boston CND Residue	HBML	NMS (2010a)
								√	√			HBML	CSM (2012)
	Mixed ³		√	HC-16	√		√				Boston Mixed Dry	HBML	NMS (2010a)
							√	√		HBML	CSM (2012)		

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Notes:

¹95% flotation; 5% detoxified tailings

²Prior to detoxification

³83% flotation; 17% detoxified tailings

⁴Composite of 40% Suluk, 30% Naartok East, 30% Naartok West

3 Methods

3.1 Sample Selection and Preparation

The program for the tailings characterization was designed to include all potential tailings streams and scenarios from Madrid North, Madrid South and Boston. Samples were generated in a number of metallurgical testing rounds. The objective of sample acquisition was to obtain representative samples of potential flotation tailings, detoxified tailings and mixed tailings for each deposit area. SRK relied on the Project geologists and metallurgists to determine which samples were representative of each respective ore zone.

For the NMS samples, ore composites for metallurgical processing were selected by HBML geologists and were composites of drill core. NMS in Englewood, Colorado prepared a tailings sample for each required test type (e.g. static, humidity cell, sub-aqueous column) and shipped the samples to Maxxam Analytics (Maxxam) for analysis.

Tailings samples were submitted for mineralogical characterization, static testing, humidity cell tests, sub-aqueous column tests, process water analysis and aging tests as outlined in Table 2.1. The Madrid South data set is comprised of static test data for flotation and detoxified tailings samples.

3.2 Mineralogy

Mineralogy analyses were performed on the tailings samples tested in the humidity cells. Bulk mineralogy was typically determined at NMS by quantitative X-Ray diffraction (QXRD) using Rietveld refinement and whole pattern fitting. Further mineralogical work was performed by NMS on a sub-set of the tailings samples using mineral liberation analysis (MLA) for trace mineralogy with emphasis on carbonates and sulphides, as well as scanning electron microscope (SEM) to determine the stoichiometric formulas of iron carbonate minerals.

3.3 Static Geochemical Tests

Static geochemical tests provide the basis for evaluating the potential reactivity and ML/ARD potential of a sample.

Static tests, including initial tests for the humidity cell and column samples, typically consisted of acid-base accounting (ABA) including paste pH, total sulphur, sulphate sulphur, fizz test and neutralization potential (NP) by the modified Sobek method (MEND 1991), total inorganic carbon (TIC) and trace element content by ICP-MS following an aqua regia digestion (ICP). TIC was determined by using a Leco furnace to directly measure CO₂ gas evolved from HCl treatment of the sample with the exception of the Boston detoxified tailings sample. For this latter sample, TIC was calculated as the difference between total carbon and organic carbon, as analyzed at NMS. Acid potential (AP) was calculated based on the total sulphur content.

Once humidity cell tests (Section 3.4) and column tests (Section 3.5) were complete, ABA and trace element content analyses were also conducted on the humidity cell and column residues.

Static tests on the Newmont tailings samples were typically conducted by Maxxam (formerly Cantest Ltd.) in Burnaby, B.C. Analytical instructions for each test were provided to Maxxam by SRK.

3.4 Humidity Cell Tests

Humidity cell tests were conducted to evaluate the kinetic geochemical behaviour and resultant seepage water quality of the Madrid North and Boston flotation, detoxified tailings and mixed tailings over time. No humidity cells were conducted for Madrid South. A summary of the Madrid North and Boston humidity cell test program and duration of testing is provided in Table 3.1.

Table 3.1: Summary of Humidity Cell Test Program

Mine	Ore Zone	Humidity Cell ID	Tailings Type	Date Started	Date Terminated	Cycles Operated
Madrid North	Naartok West	HC-56	Flotation	14-Apr-10	22-Feb-12	97
		HC-58	Detoxified tailings	16-Jun-10	22-Feb-12	88
		HC-59	Mixed ²	16-Jun-10	22-Feb-12	88
	Composite ¹	HC-14	Flotation	13-May-09	22-Feb-12	145
Boston		HC-13	Flotation	13-May-09	22-Feb-12	145
		HC-2	Detoxified tailings	20-Oct-08	31-Oct-12	210
		HC-16	Mixed ³	13-May-09	22-Feb-12	145

Notes:

¹40% Suluk, 30% Naartok East, 30% Naartok West

²95% flotation; 5% detoxified tailings

³83% flotation; 17% detoxified tailings

The humidity cell tests were primarily conducted at Maxxam using the ASTM (2001) method. Table 3.2 outlines the list of analytes and the analytical frequency used for the humidity cell test work. All analyses were conducted at Maxxam except cyanide species (total, weak acid dissociable (WAD) and free) that were conducted at Inter-Montane Laboratories Inc. (IML) in Sheridan, Wyoming and cyanide degradation products (cyanate and thiocyanate) were analyzed by NMS.

Humidity cell data were provided to SRK on a monthly basis and each report underwent quality assurance/quality control (QA/QC) by SRK.

Once the humidity cell tests were complete, ABA and trace element content analyses were conducted on the humidity cell residues. These post-test analyses followed the same method as the pre-test sample characterization (Section 3.3).

Table 3.2: Analytical Parameters and Frequency of Humidity Cells

General Parameters	Typical Frequency	Flotation	Detoxified Tailings	Mixed
pH, EC, SO ₄	Weekly	x	x	x
Alkalinity, acidity	Weekly	x	x	x
ORP or Eh	Weekly	x	x	x
Metals		x	x	x
ICP-MS (trace elements)	0, 1, 2, 4, 8, 12, 16, etc.	x	x	x
ICP-OES suite ¹	Weekly	x	x	x
Hg by CV	0, 1, 2, 4, 8, 12, 16, etc.	x		
Cyanide Species²				
Total, WAD, Free	0, 1, 2, 4, 8, 12, 16, etc.	x	x	x
SCN, CNO	0, 1, 2, 4, 8, 12, 16, etc.	x	x	x
Ions and Nutrients				
F, Cl, P, TDS	0, 1, 2, 4, 8, 12, 16, etc.	x	x	x
NO ₂ , NO ₃ , NH ₃	0, 1, 2, 4, 8, 12, 16, etc.	x	x	x

Notes:
¹ Al, Ca, Cu, Fe, Mg, K, Na and Zn

² Cyanide species analyzed for detoxified tailings and mixed tailings only

3.5 Sub-Aqueous Column Tests

Two flotation tailings humidity cells from Madrid North and Boston were also selected to be tested as sub-aqueous columns to evaluate leaching under water saturated conditions. A summary of the tailings sub-aqueous column test program and duration of testing is provided in Table 3.3.

Table 3.3: Summary of Madrid North and Boston Sub-Aqueous Column Tests

Mine	Ore Zone	Tailings Type	Column Test ID	HC Test ID	Date Started	Date Terminated	Total # Cycles ¹
Madrid North	Naartok West	Flotation	HC-56	SAD-1	12-May-10	17-Feb-12	23
Boston		Flotation	HC-13	SAD-3	12-May-10	17-Feb-12	23

Notes:
¹ Cycles are monthly

The methodology for the sub-aqueous column test setup and testing protocol is described in detail in Appendix A.

Samples were shipped from NMS to Maxxam for the column test work. Pre-test sample characterization was conducted, as described in Section 3.3. The flotation tailings samples were provided by NMS and stored fully saturated and refrigerated at the lab prior to testing. The corresponding humidity cell tests are listed in Table 3.3.

Table 3.4 outlines the list of analytes and the analytical frequency used for the column test work. Column test data were provided to SRK on a monthly basis and each report underwent QA/QC by SRK.

Once the column tests were complete, ABA and trace element content analyses were conducted on the column residues, as described in Section 3.3.

Table 3.4: Analytical Parameters and Frequency for Sub-Aqueous Columns

Parameter	Frequency
General Parameters	
pH, EC, ORP	monthly (in situ)
SO ₄ , acidity, alkalinity	monthly
Ions and Nutrients	
F, Cl, P, TDS	monthly
NO ₂ , NO ₃ , NH ₃	monthly
Metals	
ICP-MS (trace elements)	monthly
ICP-OES ¹	monthly
Hg (CVAF)	monthly

Notes:

¹ Al, Ca, Cu, Fe, Mg, K, Na and Zn

3.6 Process Water Analyses

Tailings process or supernatant water produced during metallurgical testing was analyzed where available to provide an indication of potential tailings process water chemistry for the proposed project.

NMS completed a number of metallurgical tests on the Madrid North and Boston ores. Samples that are representative of the current process include flotation tailings from Madrid North and Boston, mixed tailings from Madrid North and Boston and a detoxified tailings sample from Boston. For each of these samples, decant water was collected and analyzed for general parameters and dissolved metals if possible. This included pH, conductivity, alkalinity, total dissolved and suspended solids, cyanide species, nitrogen species, anions and total and dissolved metals by ICP-MS including major ions (Na, Ca, Mg, K). Analyses were typically conducted by NMS in Englewood, Colorado.

3.7 Aging Tests

Tailings process water generated during metallurgical testing was subjected to oxic and anoxic aging tests to assess chemical changes to the process water over time. A summary of the Madrid North and Boston tailings aging tests is presented in Table 3.5.

For the aging tests conducted at SGS in Lakefield, Ontario (Boston flotation tailings), samples were shipped from PRA where the tests were operated under the direction of SRK using the protocol in Appendix B. The aging tests for the other tailings samples were conducted at the Colorado School of Mines (CSM) in Golden, Colorado using the method outlined in Appendix C. Analytical work for these latter aging tests was performed at NMS.

For all tests, limited sample volume precluded the re-analysis of samples. For aging tests operated at CSM from January to June of 2012 (all samples except the PRA (2008) Boston flotation tailings sample), SRK's understanding from CSM is that NMS experienced QA/QC problems for metals analysis for samples containing cyanide species. Despite the samples having been acidified prior to ICP analysis, precipitates were found in the bottom of sample containers. Consequently, during the time period mentioned above, NMS began digesting unpreserved samples prior to analysis. CSM considered the resulting trace element data generated for these tests to be questionable.

The oxic tests were analyzed at week 1, week 2, week 4 and week 8 aging intervals, whereas the anoxic tests were analyzed at month 1, month 2, month 4 and month 8 aging intervals. An inventory of the parameters analyzed in each of the aging tests is presented in Table 3.6.

Table 3.5: Inventory and Metallurgical Background for Madrid North and Boston Aging Test Samples

Mine	Ore Zone	Sample Type	Proponent	Metallurgical Reference	Laboratory ¹	Oxic	Anoxic	Mixed Tailings Composition	Corresponding HC ID	Corresponding Column ID
Madrid North	Naartok West	Flotation	NMS	NMS (2010)	CSM	yes	yes	--	HC-56	SAD-1
		Mixed	NMS	NMS (2010)	CSM	yes	yes	95% flotation, 5% detoxified tailings	HC-59	--
	Naartok East	Flotation	NMS	NMS (2010)	CSM	yes	yes	--	--	--
	Suluk	Flotation	NMS	NMS (2010)	CSM	yes	yes	--	--	--
Boston		Flotation	Miramar	PRA (2008b)	SGS	yes	yes	--	HC-13	SAD-3
		Detoxified tailings	NMS	NMS (2010)	CSM	yes	yes	--	HC-2	N/A
		Flotation	NMS	CSM (2012)	CSM	yes	yes ²	--	--	--
		Mixed	NMS	CSM (2012)	CSM	yes	no	94% flotation; 6% detoxified tailings	--	--

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Notes:

¹ CSM = Colorado School of Mines; SGS = SGS Lakefield

² Partial data set due to the Project being put on hold

Table 3.6: Oxidic and Anoxic Aging Test Analytes for Madrid North and Boston Tailings Samples

Parameter*	Madrid				Boston			
	Naartok West		Naartok East	Suluk	2008**		2011**	
	Flotation Tailings	Mixed Tailings	Flotation Tailings	Flotation Tailings	Flotation Tailings	Detoxified Tailings	Flotation Tailings	Mixed Tailings
Temp Upon Receipt						x		
pH (unfiltered)						x		
EC (unfiltered)						x		
EMF (unfiltered)						x		
E _H	x	x	x	x	x	x		
DO						x		
pH	x	x	x	x	x	x	x	x
Alkalinity	x	x	x	x	x	x	x	x
Conductivity						x		
HCO ₃						x		
Carbonate						x		
TDS	x	x	x	x	x	x	x	x
OH						x		
Cl	x	x	x	x	x	x	x	x
F	x	x	x	x	x		x	x
SO ₄	x	x	x	x	x	x	x	x
NO ₂	x	x	x	x	x	x	x	x
NO ₃	x	x	x	x	x	x	x	x
NH ₃ +NH ₄	x	x	x	x	x	x	x	x
TOC	x	x	x	x	x	x	x	x
TIC						x		
C	x	x	x	x	x	x	x	x
Tot. Reactive P						x		
CN(T)		x				x	x	x
CN _{WAD}		x				x	x	x
CNO	x	x	x	x	x	x		x
CNS	x	x	x	x	x	x		x
CN(F)		x				x		x
(S ₂ O ₃) ²⁻		x				x	x	x
Hg	x	x	x	x	x	x	x	x
Hardness	x	x	x	x	x	x		
Ag	x	x	x	x	x	x	x	x
Al	x	x	x	x	x	x	x	x
As	x	x	x	x	x	x	x	x
Ba	x	x	x	x	x	x	x	x
Be	x	x	x	x	x	x	x	x
B						x		
Bi						x		
Ca	x	x	x	x	x	x	x	x
Cd	x	x	x	x	x	x	x	x
Co						x		
Cr	x	x	x		x	x	x	x
Cu	x	x	x	x	x	x	x	x
Fe	x	x	x	x	x	x	x	x
K	x	x	x	x	x	x	x	x
Li						x		
Mg	x	x	x	x	x	x	x	x
Mn	x	x	x	x	x	x	x	x
Mo	x	x	x	x	x	x	x	x
Na	x	x	x	x	x	x	x	x
Ni	x	x	x	x	x	x	x	x
P	x	x	x	x	x	x	x	x
Pb	x	x	x	x	x	x	x	x

Parameter*	Madrid				Boston			
	Naartok West		Naartok East	Suluk	2008**		2011**	
	Flotation Tailings	Mixed Tailings	Flotation Tailings	Flotation Tailings	Flotation Tailings	Detoxified Tailings	Flotation Tailings	Mixed Tailings
Sb	x	x	x	x	x	x	x	x
Se	x	x	x	x	x	x	x	x
Si	x	x	x	x	x	x	x	x
Sn						x		
Sr	x	x	x	x	x	x	x	x
Ti						x		
Tl	x	x	x	x	x	x	x	x
U		x				x	x	x
V						x		
W						x		
Y						x		
Zn	x	x	x	x	x	x	x	x

Notes:

*All parameters were analyzed on filtered samples, unless specified

**Refers to year of metallurgical testwork

4 Results

4.1 Mineralogy

Quantitative phase XRD results for the Madrid North and Boston tailings and Madrid South ore are presented in Table 4.1. The Project was put on hold before mineralogical analyses could be conducted on the Madrid South tailings. In the absence of mineralogical data for Madrid South tailings, the data for the ore is presented as an indicator of bulk mineralogy before processing. A summary of carbonate and sulphide mineralogy by XRD, MLA and SEM is provided in Table 4.2 and Table 4.3, respectively. Mineralogy reports are provided in Appendix D.

4.1.1 Madrid North

The composition of the Madrid North tailings was dominantly ferroan dolomite, quartz and for detoxified tailings only, pyrite. Chlorite, muscovite/sericite and plagioclase were also present in significant quantities (>5%). Trace minerals in selected samples included calcite, chalcopryrite, magnesite, pyrite, rutile and siderite.

Ferroan dolomite ($\text{Ca(Fe,Mg)(CO}_3)_2$) was the dominant carbonate mineral present. Iron content in the ferroan dolomite was consistently lower than magnesium, with iron (i.e. Fe_x) comprising stoichiometrically up to 0.28 of the iron+magnesium content (Table 4.2). Calcite (CaCO_3) and siderite (FeCO_3) were present at significantly lower levels than ferroan dolomite.

The key mineralogical difference between the tailings types was the abundance of sulphides (Table 4.3). Pyrite (FeS_2) was dominant in the detoxified tailings (30%) and at low levels (< 2%) in the flotation and mixed tailings. Trace sulphide minerals detected by MLA include gersdorffite ($(\text{Fe,Co,Ni)AsS}$) in all tailings types, and chalcopryrite (CuFeS_2), millerite (NiS), and pyrrhotite ($\text{Fe}_{(1-x)}\text{S}$) in the detoxified and/or mixed tailings.

4.1.2 Madrid South

The composition of the Madrid South ore samples was predominantly quartz and ferroan dolomite. Other minerals also included muscovite/sericite, paragonite, pyrite, rutile, scheelite and siderite.

Ferroan dolomite ($\text{Ca(Fe,Mg)(CO}_3)_2$) was the dominant carbonate mineral present and siderite was present in trace quantities in some of the samples. The only sulphide detected was pyrite, with levels ranging from non-detectable to 3%.

4.1.3 Boston

The composition of the Boston tailings was dominantly quartz, ferroan dolomite and for detoxified tailings only, pyrite. Other accessory minerals (around 5% or greater) included chlorite, magnesite (flotation and mixed tailings only), muscovite/sericite, and paragonite. Trace minerals in selected samples included calcite, diaspore, pyrite, rutile, siderite, and tourmaline.

Ferroan dolomite ($\text{Ca(Fe,Mg)(CO}_3)_2$) was the dominant carbonate mineral present. Iron content in the ferroan dolomite was consistently lower than magnesium, with iron (i.e. Fe_x) comprising stoichiometrically up to 0.33 of the iron+magnesium content (Table 4.2). Magnesite (MgCO_3), calcite (CaCO_3) and siderite (FeCO_3) were present at significantly lower levels than ferroan dolomite.

The key mineralogical difference between the tailings types was the abundance of sulphides (Table 4.3). Pyrite (FeS_2) was dominant in the detoxified tailings (18%) and at low levels (3%) in the mixed tailings. Sulphides were not detected by XRD in the flotation tailings. MLA analyses were not conducted for the Boston tailings samples.

Table 4.1: Quantitative Phase XRD Analysis (%)

Mine	Tailings Type	Ore Zone	Humidity Cell / Column ID	XRD Sample ID	Ferroan dolomite	Calcite	Chalcopyrite	Chlorite	Diaspore	Magnesite	Muscovite/Sericite	Paragonite	Plagioclase	Pyrite	Quartz	Rutile	Scheelite	Siderite	Tourmaline
Madrid North	Flotation	Naartok West	HC-56 / SAD-1	NW-BFT-1, Dry	38	2		9			13		9		26	1		2	
		Naartok East		NE-BFT-dry	38			7		10	8		17		19	1			
		Suluk		Suluk dry	46	1		15		2	9		5		21	1			
		Composite ⁴	HC-14	Suluk, Nartok E, W: 40,30,30 %	39	<1		10			9		11		26	2		3	
	Detoxified tailings	Naartok West	HC-58	NW CNDT SS 20100602 after KP	27		tr	16			9		5	30	10	2			
				Naartok West, Residue	38	3		10			3		7	15	19	2		3	
		Naartok East		Naartok East, Residue	30	tr		5			3		21	26	11	2		2	
		Suluk		Suluk, Residue	32	tr		10			3		10	29	13	2			
	Mixed ¹	Naartok West	HC-59	NW-MT-SS-0-20100609	33	2		13			13		8	1	28	1		1	
Madrid South	Ore ²	Patch 14		Various (4 samples from NMS 2010b)	7-31						2-9	bd-17		bd-3	38-89	<1-1	bd-1	bd-1	
Boston	Flotation		HC-13 / SAD-3	Calculated as average	33	1		4		5	8	6			41	1		1	2
				Boston Float Tail	30	1		4		6	7	5			42	1			4
				B-BFT-1, Dry	35			4		4	8	6			40	1		1	
	Detoxified tailings		HC-2	Boston CND RES	28			2	1		12	6		18	22	2		1	
				Boston CND Residue	31			6	1		12	6		18	22	2		1	
			Mixed ³	HC-16	Boston Mixed Dry	31			6		8	5	7		3	36	1		

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Notes:

- ¹95% flotation; 5% detoxified tailings
- ²Project put on hold before XRD data generated for tailings samples.
- ³83% flotation; 17% detoxified tailings
- ⁴40% Suluk, 30% Naartok East, 30% Naartok West
- tr = trace
- bd = below detection

Mineral Formulas:

- Ankerite/Dolomite – Ca(Fe,Mg)(CO₃)₂
Calcite – CaCO₃
Chalcopyrite – CuFeS₂
Chlorite – (Mg,Fe,Al)₆(Al,Si)₄O₁₀(OH)₈
Diaspore – AlO(OH)
Magnesite - MgCO₃
Muscovite/Sericite - KAl₂(AlSi₃O₁₀)(OH)₂
- Paragonite - NaAl₃Si₃O₁₀(OH)₂
Plagioclase - (Ca,Na)(Al,Si)AlSi₂O₈
Pyrite - FeS₂
Quartz - SiO₂
Rutile - TiO₂
Siderite - FeCO₃
Tourmaline - Na(Fe,Mg)₃Al₆Si₆O₁₈(BO₃)₃(OH)₄

Table 4.2: Carbonate Mineralogy by XRD, MLA and SEM

Mine	Tailings Type	Ore Zone	Humidity Cell / Column ID	XRD Sample ID	Ferroan Dolomite Ca(Fe,Mg)(CO ₃) ₂				Siderite FeCO ₃				Magnesite MgCO ₃	Calcite CaCO ₃		
					XRD	MLA	RPD%	SEM	XRD	MLA	RPD%	SEM	XRD	XRD	MLA	RPD%
					mineral %				mineral %				mineral %		mineral %	
Madrid North	Flotation	Naartok West	HC-56 / SAD-1	NW-BFT-1, Dry	38	36	7%	Ca(Mg _{0.74} Fe _{0.26})CO ₃	2	1.24	47%	(Fe _{0.52} Mg _{0.48})CO ₃	bd	2	1.03	64%
		Naartok East		NE-BFT-dry	38	-	-	-	bd	-	-	-	10	bd	-	-
		Suluk		Suluk dry	46	-	-	-	bd	-	-	-	2	1	-	-
		Composite ⁴	HC-14	Suluk, Nartok E, W: 40,30,30 %	39	-	-	Ca(Mg _{0.72} Fe _{0.28})CO ₃	3	-	-	(Fe _{0.58} Mg _{0.42})CO ₃	bd	tr	-	-
	Detoxified tailings	Naartok West	HC-58	NW CNDT SS 20100602 after KP	27	27	1%	Ca(Mg _{0.72} Fe _{0.28})CO ₃	bd	0.31	>100%	-	bd	bd	0.22	>100%
				Naartok West, Residue	38	-	-	-	3	-	-	-	bd	3	-	-
		Naartok East		Naartok East, Residue	30	-	-	-	2	-	-	-	bd	tr	-	-
			Suluk		Suluk, Residue	32	-	-	-	bd	-	-	-	bd	tr	-
	Mixed ¹	Naartok West	HC-59	NW-MT-SS-0-20100609	33	32	4%	Ca(Mg _{0.73} Fe _{0.27})CO ₃	1	1.53	43%	(Fe _{0.55} Mg _{0.45})CO ₃	bd	2	0.78	88
Madrid South	Ore ²	Patch 14		Various (4 samples from NMS 2010b)	7-31	-	-	-	bd-1	-	-	-	bd	bd	-	-
Boston	Flotation		HC-13 / SAD-3	Calculated as average	33	-	-	Ca(Mg _{0.67} Fe _{0.33})CO ₃	1	-	-	(Fe _{0.50} Mg _{0.50})CO ₃	5	1	-	-
				Boston Float Tail	30	-	-	-	bd	-	-	-	6	1	-	-
				B-BFT-1, Dry	35	-	-	-	1	-	-	-	4	bd	-	-
	Detoxified tailings		HC-2	Boston CND RES	28	-	-	-	1	-	-	-	bd	bd	-	-
				Boston CND Residue	31	-	-	-	1	-	-	-	bd	bd	-	-
	Mixed ³		HC-16	Boston Mixed Dry	31	-	-	Ca(Mg _{0.67} Fe _{0.33})CO ₃	bd	-	-	(Fe _{0.49} Mg _{0.51})CO ₃	8	bd	-	-

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Notes:

¹95% flotation; 5% detoxified tailings

²Project put on hold before XRD data generated for tailings samples.

³83% flotation; 17% detoxified tailings

⁴40% Suluk, 30% Naartok East, 30% Naartok West

RPD = relative percent difference (absolute).

bd = below detection.

“-” denotes sample was not analyzed

Table 4.3: Sulphide Mineralogy by XRD and MLA

Mine	Tailings Type	Ore Zone	Humidity Cell / Column ID	XRD Sample ID	Pyrite		Arsenopyrite	Chalcopyrite		Cobaltite	Galena	Gersdorffite	Millerite	Pyrrhotite	Sulphur %		
					XRD	MLA	MLA	XRD	MLA	MLA	MLA	MLA	MLA	MLA	XRD	MLA	ABA
					mineral %										%S		
Madrid North	Flotation	Naartok West	HC-56 / SAD-1	NW-BFT-1, Dry	bd	0.35	bd	bd	bd	bd	bd	0.01	bd	bd	bd	0.19	0.08
		Naartok East		NE-BFT-dry	bd	-	-	bd	-	-	-	-	-	-	bd	-	-
		Suluk		Suluk dry	bd	-	-	bd	-	-	-	-	-	-	bd	-	-
		Composite ⁴	HC-14	Suluk, Nartok E, W: 40,30,30 %	bd	-	-	bd	-	-	-	-	-	-	bd	-	0.09
	Detoxified tailings	Naartok West	HC-58	NW CNDT SS 20100602 after KP	30	42	bd	tr	0.27	bd	bd	0.26	0.03	0.08	7	23	19
				Naartok West, Residue	15	-	-	bd	-	-	-	-	-	-	bd	-	-
		Naartok East		Naartok East, Residue	26	-	-	bd	-	-	-	-	-	-	bd	-	-
		Suluk		Suluk, Residue	29	-	-	bd	-	-	-	-	-	-	bd	-	-
	Mixed ¹	Naartok West	HC-59	NW-MT-SS-0-20100609	1	1.9	bd	bd	0.02	bd	bd	0.02	bd	0.02	bd	1.1	0.98
Madrid South	Ore ²	Patch 14		Various (4 samples from NMS 2010b)	bd-3	-	-	bd	-	-	-	-	-	-	bd-1	-	-
Boston	Flotation		HC-13 / SAD-3	Calculated as average	bd	-	-	bd	-	-	-	-	-	-	bd	-	0.05
				Boston Float Tail	bd	-	-	bd	-	-	-	-	-	-	bd	-	-
				B-BFT-1, Dry	bd	-	-	bd	-	-	-	-	-	-	bd	-	-
	Detoxified tailings		HC-2	Boston CND RES	18	-	-	bd	-	-	-	-	-	-	4	-	13
				Boston CND Residue	18	-	-	bd	-	-	-	-	-	-	bd		
	Mixed ³		HC-16	Boston Mixed Dry	3	-	-	bd	-	-	-	-	-	-	-	1	-

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Notes:

¹95% flotation; 5% detoxified tailings

²Project put on hold before XRD data generated for tailings samples.

³83% flotation; 17% detoxified tailings

⁴40% Suluk, 30% Naartok East, 30% Naartok West

RPD = relative percent difference (absolute).

bd = below detection.

“ - ” denotes sample was not analyzed

Sulphide Mineral Formulas:

Pyrite – FeS₂
Arsenopyrite – FeAsS
Chalcopyrite – CuFeS₂
Cobaltite - CoAsS
Galena – PbS
Gersdorffite – (Fe,Co,Ni)AsS

Millerite – NiS
Pyrrhotite – Fe_(1-x)S
Sphalerite - ZnS
Tetradymite – Bi₂Te₂S
Tetrahedrite – Cu₃SbS₃

4.2 Static Tests

4.2.1 Acid-Base Accounting

Selected ABA data for Madrid North, Madrid South and Boston tailings, including humidity cell and column test samples, are presented in Table 4.4. The complete ABA data set is presented in Appendix E.

For the Madrid North, Madrid South and Boston tailings, total sulphur content was consistent with the mineralogy data (Section 4.1) in that levels are related to tailings type (Figure 4.1).

Specifically, total sulphur content was highest in the detoxified tailings (8.5% to 19%), which was greater than the mixed tailings (0.98% to 2.1%), which was greater than flotation tailings (<0.02% to 0.11%). For the flotation tailings only, sulphur levels were also related to deposit area: sulphur content for Madrid South (<0.02% to 0.05%) was typically lower than Boston (0.05%), which was lower than Madrid North (0.08% to 0.11%). There was no mixed tailings sample from Madrid South.

Modified NP was typically high for all samples regardless of tailings type or mining area, with levels ranging from 90 to 399 kgCaCO₃/t for all samples except for the flotation tailings from Madrid South, which had a lower NP of 40 kgCaCO₃/t (Figure 4.2). With the exception of the detoxified tailings sample from Boston, TIC levels were typically high (ranging from 60 to 515 kgCaCO₃/t) and consistently higher than NP, suggesting the presence of iron carbonate, which results in TIC values that overestimate the actual amount of carbonate capable of providing buffering. This is consistent with the mineralogical testwork that identified ferroan dolomite ((Ca(Fe,Mg)(CO₃)₂) and siderite (FeCO₃) in the Madrid North and Boston tailings samples (Section 4.1) and ferroan dolomite in the Madrid South ore (quartz vein) samples (SRK 2016b).

The detoxified tailings sample from Boston had anomalously low TIC (7.5 kgCaCO₃/t) compared to NP (210 kgCaCO₃/t) and the overall sample set. Based on the abundance of carbonate minerals identified in the Boston detoxified tailings sample (e.g. 28% ferroan dolomite, Section 4.1) and the strong fizz rating for the Boston detoxified tailings sample (which qualitatively indicates a significant level of carbonates), the TIC value of 7.5 kgCaCO₃/t is considered to be erroneously low. TIC for the Boston detoxified tailings was determined using a different method than the other samples (Table 4.4). Table 4.4, Figure 4.3 and Figure 4.4 present the ARD classifications of the tailings samples where AP is calculated from total sulphur. ARD classifications were consistent using both NP/AP and TIC/AP methods, with the flotation and mixed tailings samples classified as non-PAG and the detoxified tailings as PAG.

Table 4.4: Acid-Base Accounting Data for Madrid North, Madrid South and Boston Tailings Samples

Mine	Tailings Type	Ore Zone	Sample ID	Paste pH	Total S %S	Sulphate S %S	Sulphide %S	AP kg CaCO ₃ /t	Fizz Test	TIC kgCaCO ₃ /t	Mod NP kgCaCO ₃ /t	NP/AP	TIC/AP
Madrid North	Flotation	Naartok West	HC-56 / SAD-1	8.5	0.08	0.01	0.08	2.5	Strong	385	319	128	154
		Naartok East		8.7	0.11	0.01	0.1	3.1	Strong	439	358	114	140
		Suluk		8.7	0.1	0.01	0.09	2.8	Strong	515	399	142	183
		Composite ⁴	HC-14	9.0	0.09	0.01	0.09	2.8	Strong	435	358	127	155
	Detoxified tailings	Naartok West	HC-58	7.8	18.75	0.07	18.68	584	Strong	306	247	0.42	0.52
	Mixed ¹	Naartok West	HC-59	8.5	0.98	0.01	0.98	31	Strong	423	307	10	14
Madrid South	Flotation	Patch 14	172195	9.1	0.05	0.01	0.05	1.6	Moderate	391	278	178	250
			172198	9.0	0.02	0.01	0.02	0.63	Moderate	263	185	296	420
			172199	8.8	0.02	0.01	0.02	0.63	Moderate	60	40	64	96
			172200	9.1	0.02	0.01	0.02	0.63	Moderate	137	101	162	219
			P14 BFT Solids ABA Maxxam	9.7	0.03	0.03	0.02	0.63	Moderate	265	184	294	424
	Detoxified tailings ²	Patch 14	179048	8.3	15.44	0.03	15.41	482	Moderate	233	155	0.32	0.48
			179049	8.3	18.56	0.02	18.54	579	Moderate	189	133	0.23	0.33
			179050	8.8	8.47	0.01	8.46	264	Moderate	120	93	0.35	0.45
Boston	Flotation		HC-13 / SAD-3	8.5	0.05	0.01	0.05	1.6	Strong	358	279	178	229
	Detoxified tailings		HC-2	7.8	12.86	0.03	12.83	401	Strong	7.5 ^a	210	0.52	0.019
	Mixed ³		HC-16	8.3	2.1	0.01	2.09	65	Strong	380	267	4.1	5.8

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Notes:

¹95% flotation; 5% detoxified tailings

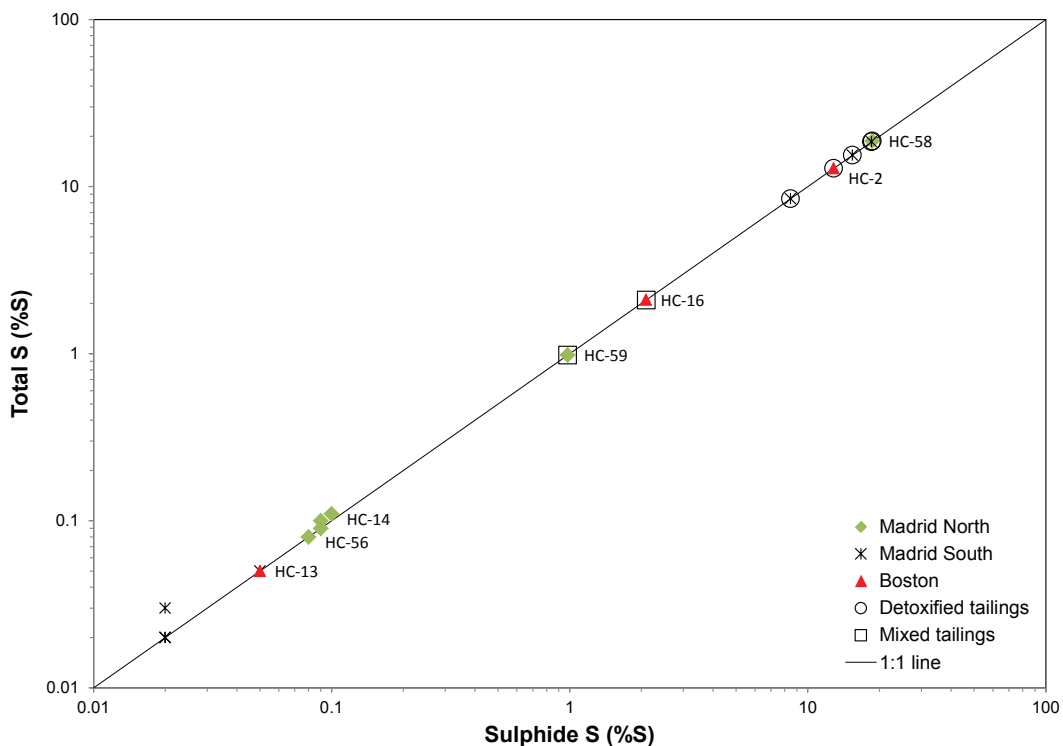
²Prior to detoxification

³83% flotation; 17% detoxified tailings

⁴Composite of 40% Suluk, 30% Naartok East, 30% Naartok

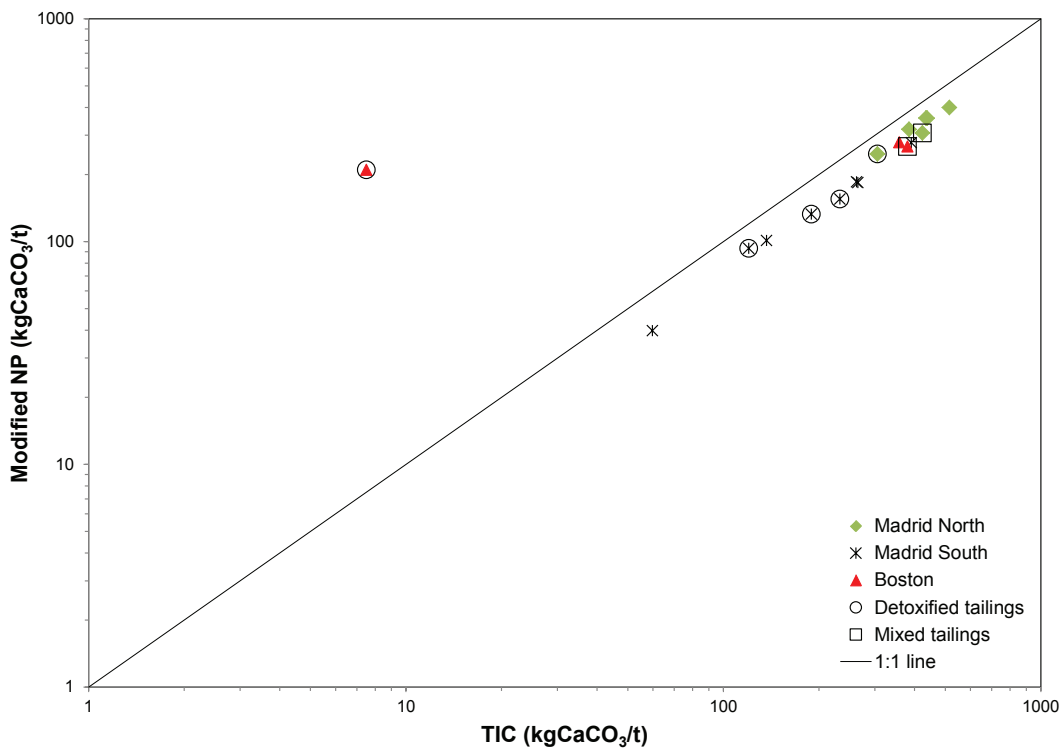
^aDetermined as the difference between total carbon and organic carbon. See Section 3.3 for details.

Blue italics = value less than laboratory detection limit. Detection limit shown.



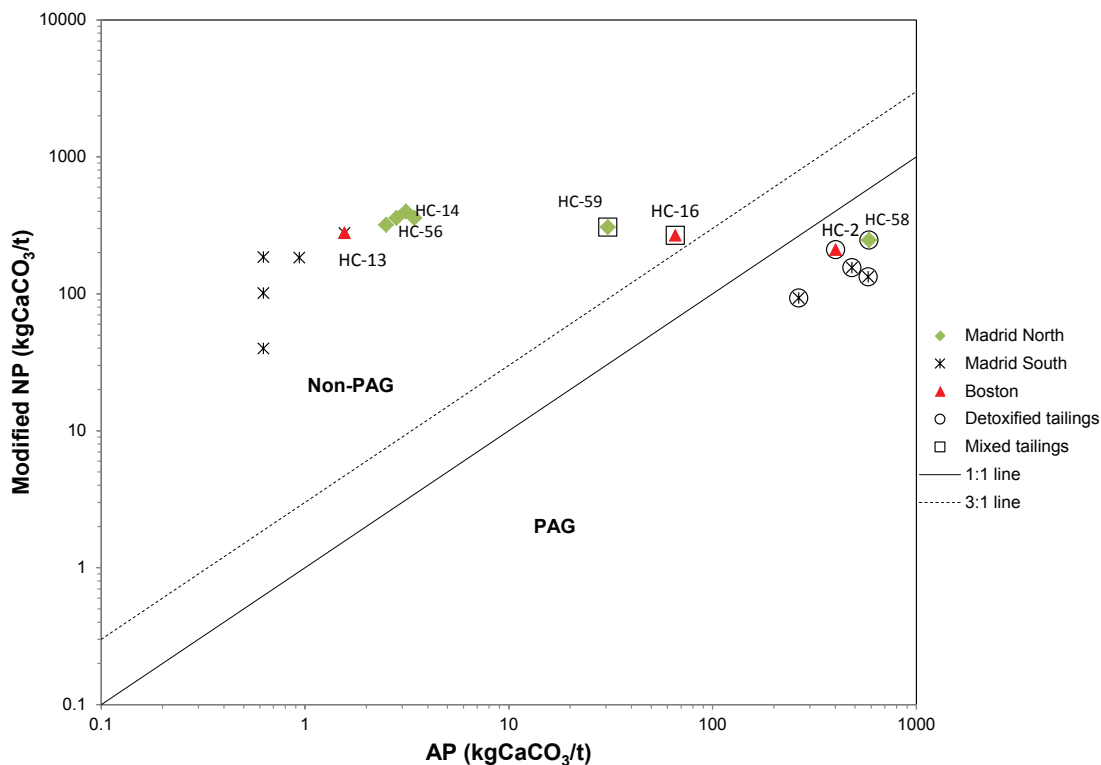
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Figure 4.1: Comparison of Total Sulphur and Sulphide Sulphur for Tailings Samples



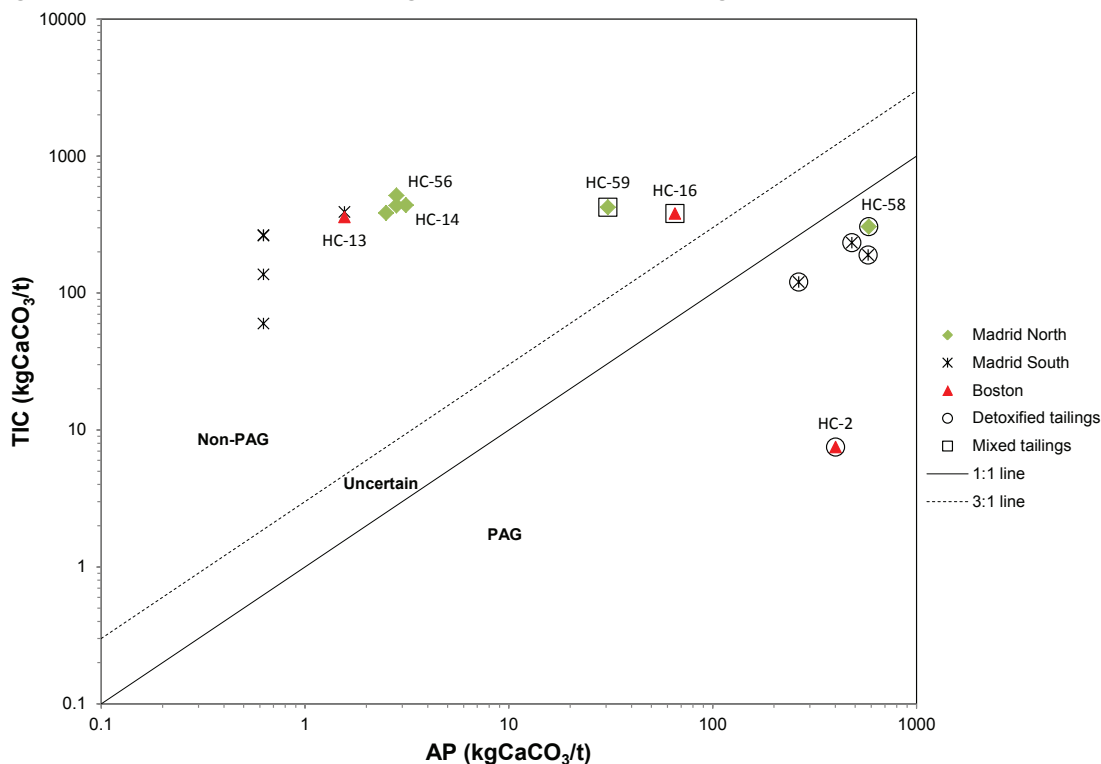
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Figure 4.2: Comparison of Modified NP and TIC for Tailings Samples



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Figure 4.3: ARD Classifications using Modified NP for the Tailings Samples



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Figure 4.4: ARD Classifications using TIC for the Tailings Samples

4.2.2 Trace Element Content

Trace element data is presented in Appendix F.

Trace element content in the tailings samples was analyzed to quantify the bulk geochemical composition. Trace element content was compared to ten times the crustal abundance for basalt (Price 1997) to indicate related enrichment.

Selected trace element data for Madrid North, Madrid South and Boston tailings, including humidity cell and column test samples, are presented in Table 4.5, with bold values indicating values that were greater than ten times the concentration of typical basalt. The data could not be assessed for various samples, as described as follows:

- Bismuth: for Madrid North and Boston samples, levels were either below detection or within the range of analytical uncertainty.
- Selenium: for flotation and mixed tailings samples levels were below or within the range of analytical uncertainty.

Madrid North

The trace element content for Madrid North flotation, detoxified and mixed tailings is summarized as follows:

- Arsenic was elevated in all tailings samples. Arsenic was an order of magnitude higher in the detoxified tailings compared to the flotation and mixed tailings.
- Gold was elevated in all tailings samples.
- Copper, nickel, sulphur, antimony and selenium were elevated in the detoxified tailings sample. Of these parameters, sulphur was also elevated in the mixed tailings sample.

Madrid South

The trace element content for Madrid South flotation and detoxified tailings is summarized as follows:

- Arsenic was elevated in the detoxified tailings and two of the five flotation tailings samples.
- Gold was elevated in all tailings samples.
- Bismuth, sulphur and selenium were elevated in all detoxified tailings samples.
- Copper, lead and antimony were elevated in selected detoxified tailings samples.
- Silver and tungsten were elevated in selected flotation and detoxified tailings samples.

Boston

The trace element content for Boston flotation, detoxified and mixed tailings is summarized as follows:

- Arsenic, gold and tungsten were elevated in all tailings samples. Arsenic levels were highest in the detoxified tailings and lowest in the flotation tailings.
- Silver, sulphur, antimony and selenium were elevated in selected samples.

4.2.3 Comparison of Hope Bay Tailings Geochemistry

Due to the Project being put on hold by HBML in 2012, the Madrid South metallurgical program did not advance from bench scale to pilot plant scale, the latter from which sufficient tailings sample quantities are produced for kinetic testing, e.g. humidity cell tests etc. Accordingly, the Madrid South data set is comprised of static data for flotation and detoxified tailings samples. For the purposes of source terms predictions (SRK 2016a), analogs for the Madrid South flotation and detoxified tailings are required. The static data for tailings from the Project (Sections 4.2.1, 4.2.2 and SRK 2015) was reviewed. Mixed tailings data are presented for completeness but not discussed as mixed tailings will not be produced under the current mine plan. NP and TIC data were uniformly high for all deposit areas, therefore the focus of the discussion is total sulphur and arsenic.

For flotation tailings, total sulphur for Madrid South was lowest and Madrid North highest (Figure 4.5). Median sulphur levels for Boston samples were higher than, but most comparable, to Madrid South. Arsenic levels were variable between deposit areas, with Doris having the lowest and Madrid North the highest (Figure 4.6). Madrid South arsenic levels for flotation tailings were higher than Doris but lower than Boston. Based on total sulphur and arsenic levels, Boston is the most geochemically appropriate and conservative analog for Madrid South flotation tailings.

For detoxified tailings, total sulphur levels are uniformly high and equivalent for all deposit areas but arsenic levels were lower for Doris. Arsenic levels were overall equivalent and high for Madrid North, Madrid South and Boston detoxified tailings. On this basis, detoxified tailings data from Madrid North and/or Boston can be used as a proxy for Madrid South.

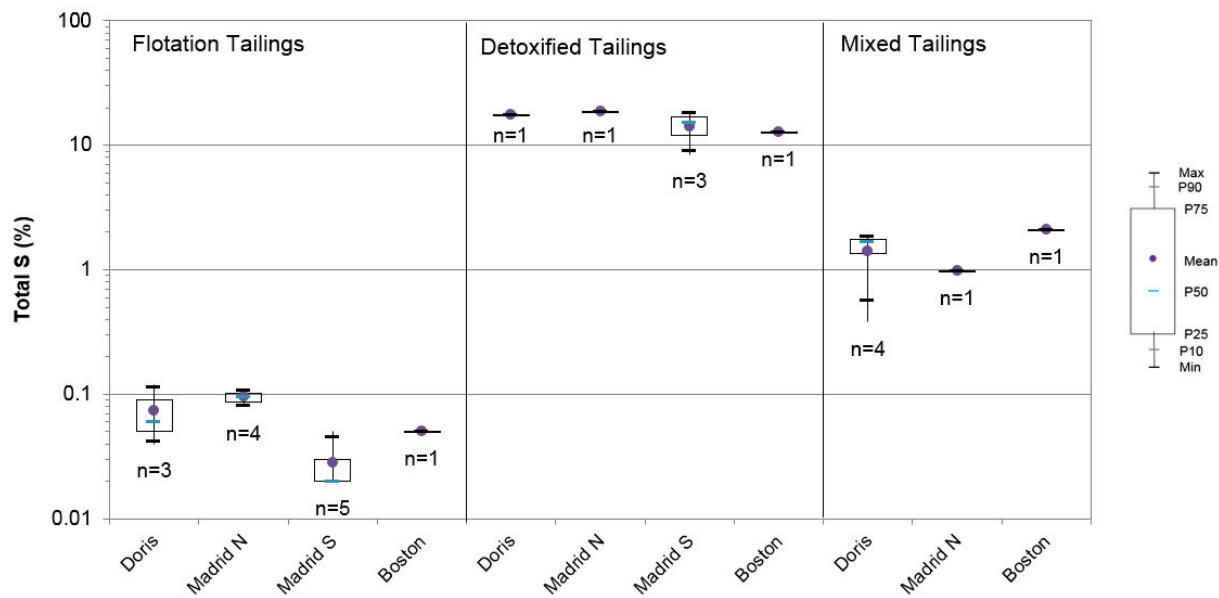
Table 4.5: Selected Trace Element Data for Madrid North, Madrid South and Boston Tailings Samples

Mine	Tailings Type	Ore Zone	Sample ID	Ag ppm	As ppm	Au ppb	Bi ppm	Cd ppm	Co ppm	Cu ppm	Mo ppm	Ni ppm	Pb ppm	S %	Sb ppm	Se ppm	W ppm	Zn ppm
Madrid North	Flotation	Naartok West	HC-56	0.1	340	78	0.1	0.1	34	38	0.9	270	1.8	0.06	0.7	0.5	3.9	39
		Naartok East		<i>0.1</i>	330	84	<i>0.1</i>	0.1	34	29	0.9	290	3.6	0.09	0.5	<i>0.5</i>	0.3	26
		Suluk		<i>0.1</i>	260	140	<i>0.1</i>	<i>0.1</i>	35	29	1.2	320	2.4	0.08	0.3	<i>0.5</i>	4.1	38
		Composite ⁴	HC-14	0.1	310	720	0.1	0.1	34	33	0.9	300	2.6	0.08	0.3	0.5	2.5	36
	Detoxified tailings	Naartok West	HC-58	0.9	3700	55	0.9	0.2	430	1600	11	1800	30	10	4.2	9	3	78
	Mixed ¹	Naartok West	HC-59	0.1	520	160	0.1	0.1	57	110	1.6	350	3.3	0.96	0.8	0.6	4.4	39
Madrid South	Flotation	Patch 14	172195	<i>0.1</i>	37	76	0.2	0.5	10	18	4.1	39	1.7	<i>0.05</i>	0.1	<i>0.5</i>	0.5	41
			172198	<i>0.1</i>	21	100	<i>0.1</i>	0.1	5.5	13	4.8	35	1.5	<i>0.05</i>	0.1	<i>0.5</i>	0.8	26
			172199	1.2	8.6	3000	<i>0.1</i>	<i>0.1</i>	1.7	15	5.1	19	13	<i>0.05</i>	0.5	<i>0.5</i>	77	17
			172200	<i>0.1</i>	5.8	400	<i>0.1</i>	<i>0.1</i>	2.5	10	6.4	23	1.2	<i>0.05</i>	0.1	<i>0.5</i>	52	20
			P14 BFT Solids ABA Maxxam	0.2	14	200	<i>0.1</i>	<i>0.1</i>	5.6	15	1.2	22	1.3	<i>0.05</i>	<i>0.1</i>	<i>0.5</i>	38	40
	Detoxified tailings ²	Patch 14	179048	1	3200	3400	4.9	1.6	250	970	6.8	510	47	>10	1.4	10	3.3	91
			179049	2.3	3300	6300	2.3	0.8	280	790	7.1	610	42	>10	1	14	1.9	63
			179050	1.6	1800	2100	1.4	1	170	870	12	350	440	8.4	9.4	6.7	99	260
Boston	Flotation		HC-13	0.1	86	210	0.1	0.2	13	31	2.6	62	2.2	0.05	0.4	0.5	76	68
	Detoxified tailings		HC-2	1.3	4200	530	0.4	1.2	240	580	7.9	1000	56	n/a	4.8	9.6	42	260
	Mixed ³		HC-16	0.3	690	260	0.1	0.3	50	130	6	240	9.5	2.2	1.2	1.7	73	99
Ave. Crustal Abundance for Basalt (Price 1997)				<i>0.11</i>	2	4	<i>0.007</i>	<i>0.22</i>	48	87	1.5	130	6	<i>0.03</i>	<i>0.2</i>	<i>0.05</i>	<i>0.7</i>	110

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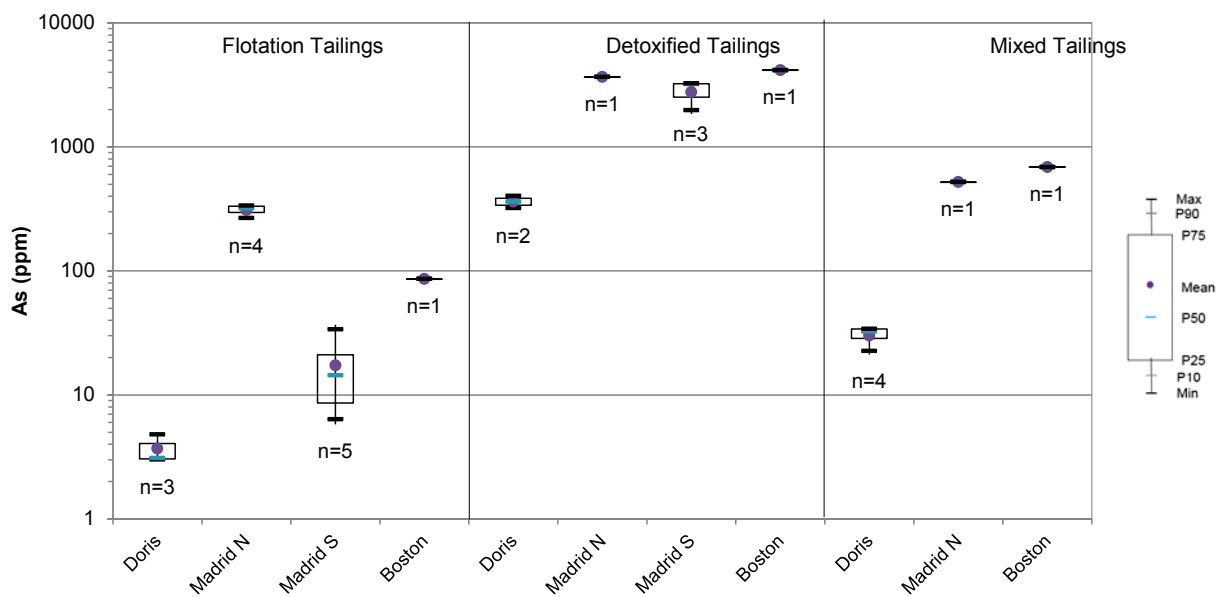
Notes:

- ¹95% flotation; 5% detoxified tailings
- ²Prior to detoxification
- ³83% flotation; 17% detoxified tailings
- ⁴Composite of 40% Suluk, 30% Naartok East, 30% Naartok West
- Blue italics = value less than laboratory detection limit. Detection limit shown.
- Bolded values are ten times greater than Price (1997)
- n/a denotes data not available



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Figure 4.5: Comparison of Total Sulphur Distribution in Tailings, Hope Bay Project



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Figure 4.6: Comparison of Arsenic Content Distribution in Tailings, Hope Bay Project

4.3 Humidity Cell Tests

The solids characteristics of the seven Madrid North and Boston flotation, detoxified and mixed tailings samples tested in the humidity cell program have been discussed in the sections above.

ARD predictions for each humidity cell test (HCT) were performed using two factors, including:

- Comparison of sulphide with NP and TIC depletion times; and
- Comparison of the molar ratio of calcium-plus-magnesium over sulphate with acid base accounting data.

Laboratory results for the humidity cell testwork and summaries of key results are provided in Appendix G. Figures showing humidity cell time trends are provided in Appendix H.

The humidity cell data indicate that flotation tailings and mixed tailings from both Madrid North and Boston are projected to remain neutral and detoxified tailings will possibly develop ARD, as outlined in Table 4.6. The humidity cell ARD predictions are in agreement with ABA tests. All cells remained neutral to alkaline throughout the testing period, including the Boston detoxified tailings sample (HC-2) that operated for 210 cycles. A detoxified tailings sample from Doris (HC-1b) developed acidic conditions almost four years (or 200 cycles) into operation (SRK 2015).

Table 4.6: ARD Classification for Madrid North and Boston Humidity Cell Tailings Samples

Tailings Type	Mine	Ore Deposit	Humidity Cell ID	NP/AP	TIC/AP	ABA Classification	Kinetic Prediction	
							Neutral	Acidic
Flotation	Madrid North	Naartok West	HC-56	128	154	non-PAG	likely	
	Madrid North	Madrid composite ³	HC-14	127	155	non-PAG	likely	
	Boston	Main	HC-13	178	229	non-PAG	likely	
Mixed	Madrid North ¹	Naartok West	HC-59	10	14	non-PAG	likely	
	Boston ²	Main	HC-16	4.1	5.8	non-PAG	likely	
Detoxified tailings	Madrid North	Naartok West	HC-58	0.4	0.5	PAG		possible
	Boston	Main	HC-2	0.5	0.02	PAG		possible

Notes:

¹95% flotation; 5% detoxified tailings

²83% flotation; 17% detoxified tailings

³Composite of 40% Suluk, 30% Naartok East, 30% Naartok West

Sulphate loadings, a possible indication of sulphide oxidation in the humidity cell tests, are summarized in Table 4.7 according to initial, overall and stable rates. Results indicate that:

- Sulphate rates were highest during the initial weeks of operation, which is typical of humidity cell tests flushing oxidation products that likely accumulated prior to operation. Rates for all tailings types gradually decreased and then stabilized over time.
- Sulphate loadings were related to tailings type with stable rates highest for the detoxified tailings, lowest for the flotation tailings, and sulphate rates for the mixed tailings at levels between the detoxified and flotation tailings (Figure 4.7).

- Stable sulphate rates for the detoxified tailings typically exceeded the flotation tailings by two orders of magnitude and the mixed tailings by an order of magnitude.
- Sulphate rates for Madrid North were higher than Boston for all tailings types.

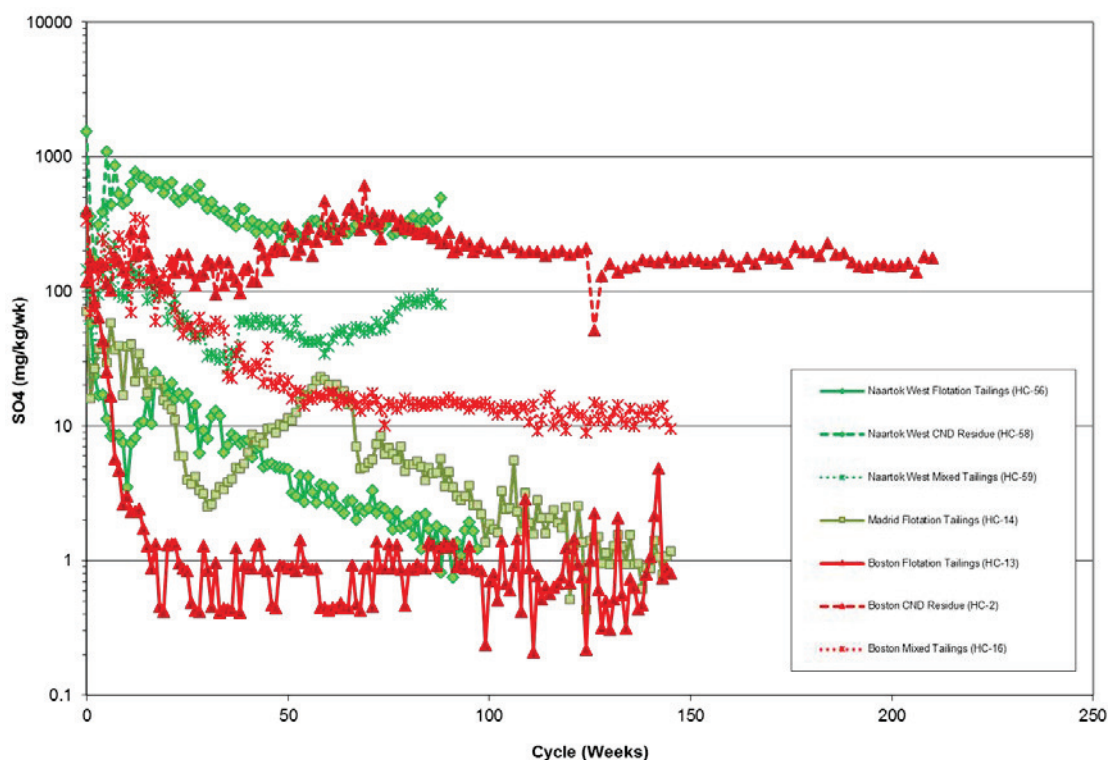
Table 4.7: Summary of Sulphate Release Rates for Madrid North and Boston Humidity Cell Tailings Samples

Tailings Type	Mine	Humidity Cell ID	Initial Rate ¹	Overall Rate	Stable Rate
			SO ₄	SO ₄	SO ₄
			mg/kg/week		
Flotation	Madrid North	HC-56	380	11	1.5
	Madrid North	HC-14	70	9.3	1.1
	Boston	HC-13	120	4.4	0.9
Mixed	Madrid North	HC-59	150	74	85
	Boston	HC-16	340	42	12
Detoxified tailings	Madrid North	HC-58	1550	420	380
	Boston	HC-2	400	200	160

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Notes:

¹ Initial Rate = rate from week 1



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Figure 4.7: Madrid North and Boston Humidity Cell Sulphate Loadings over Time

Humidity cell trace metal concentrations are summarized in Table 4.8 for select parameters (see Appendix G for complete results). Multiple parameters had relatively high loadings during the early weeks of operation, then declined sharply. This is typical of these types of tests and coincides with the flushing of existing weathering products and precipitates that accumulated prior to the start of testing. Detection limits were elevated for a number of parameters, including free cyanide, cadmium, mercury and selenium, which often limited data interpretation. Trends for select parameters are noted as follows:

- Arsenic:
 - Arsenic was elevated in most cells with levels (median values) highest in Madrid North flotation tailings (Table 4.8; Figure 4.8).
 - For Madrid North, arsenic levels (median values) were highest in flotation tailings and lowest in detoxified tailings i.e. flotation tailings > mixed tailings > detoxified tailings. These results are in contrast to the results of the solids analyses which indicated higher arsenic concentrations in the detoxified tailings. Arsenic concentrations are typically controlled by adsorption to iron hydroxides, and may be less mobile in the detoxified tailings. Detoxified tailings contain higher levels of iron sulphide minerals, resulting in higher rates of iron release and iron hydroxide precipitation.
 - For Boston, arsenic levels (median values) were highest in the mixed tailings and lowest in the flotation tailings i.e. mixed tailings > detoxified tailings > flotation tailings.
 - Results from the Hope Bay waste rock humidity cell test program (e.g. SRK 2016c) suggested a relationship between arsenic leaching and the presence of the trace sulphide mineral gersdorffite ((Fe,Co,Ni)AsS). Gersdorffite was identified at trace levels in all Madrid North tailings samples suggesting that this may also be a control on arsenic leaching. Trace mineralogical data were not available for the Boston samples.

Table 4.8: Summary of Madrid North and Boston Humidity Cell Trace Metal Concentrations for Selected Parameters

	Tailings Type	Mine	Humidity Cell ID	Nitrite-N	Total Ammonia	Total CN	Al	Sb	As	Cd	Cr	Cu	Fe	Pb	Mn	Mo	Ni	P	Se	Ag	Zn
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Median	Flotation	Madrid North	HC-56	0.005	0.05	na	0.041	0.0020	0.16	0.000005	0.0003	0.0004	0.010	0.00003	0.0021	0.0022	1.4E-06	0.005	0.0002	0.00001	0.0005
		Madrid North	HC-14	0.01	0.07	na	0.031	0.0009	0.057	0.000005	0.0005	0.0003	0.010	0.00002	0.003	0.0023	0.0013	0.011	0.0002	0.00001	0.0008
		Boston	HC-13	0.01	0.16	na	0.0037	0.0002	0.002	0.000007	0.0004	0.0003	0.010	0.00004	0.0005	0.0018	0.0005	0.007	0.0002	0.00001	0.0010
	Mixed	Madrid North	HC-59	0.005	0.05	0.14	0.021	0.0015	0.030	0.000005	0.0007	0.0006	0.23	0.00003	0.029	0.0068	0.0066	0.008	0.0004	0.00001	0.0008
		Boston	HC-16	0.01	0.17	0.02	0.0032	0.0015	0.013	0.000005	0.0002	0.0008	0.010	0.00003	0.014	0.0023	0.003	0.010	0.002	0.00001	0.0010
	Detoxified Tailings	Madrid North	HC-58	0.005	1.4	0.02	0.0031	0.0002	0.006	0.000021	0.0001	0.0014	0.010	0.00002	0.49	0.00056	0.21	0.012	0.002	0.00001	0.0011
		Boston	HC-2	0.00	0.14	0.02	0.0020	0.0014	0.003	0.000030	0.0002	0.0008	0.010	0.00005	0.091	0.0003	0.077	0.015	0.005	0.00002	0.0030
Maximum	Flotation	Madrid North	HC-56	0.103	0.27	na	0.070	0.022	1.3	0.00018	0.012	0.010	0.06	0.0011	0.049	0.053	0.00005	0.03	0.02	0.00007	0.0093
		Madrid North	HC-14	0.05	0.34	na	0.050	0.005	0.37	0.00004	0.0010	0.030	0.070	0.0002	0.043	0.014	0.024	0.11	0.003	0.0001	0.0078
		Boston	HC-13	0.04	0.45	na	0.011	0.004	0.05	0.00008	0.0011	0.004	0.030	0.0002	0.081	0.33	0.038	0.07	0.009	0.0002	0.0093
	Mixed	Madrid North	HC-59	0.221	0.87	0.79	0.040	0.025	0.97	0.00005	0.0085	0.004	0.53	0.0043	0.11	0.080	0.099	0.16	0.005	0.0001	0.0070
		Boston	HC-16	0.02	0.62	0.12	0.010	0.009	0.11	0.00004	0.0010	0.040	0.070	0.0015	0.63	0.12	0.55	0.12	0.010	0.0002	0.011
	Detoxified Tailings	Madrid North	HC-58	0.05	3.7	0.09	0.060	0.0059	0.14	0.00008	0.0007	0.010	0.22	0.0006	3.0	0.033	3.3	0.08	0.03	0.00009	0.0051
		Boston	HC-2	0.01	4.38	0.06	0.090	0.10	0.32	0.00020	0.0010	0.026	0.070	0.0010	0.37	0.045	0.51	0.15	0.02	0.0008	0.0090

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Notes:

n/a denotes data not available because flotation tailings do not contain cyanide.

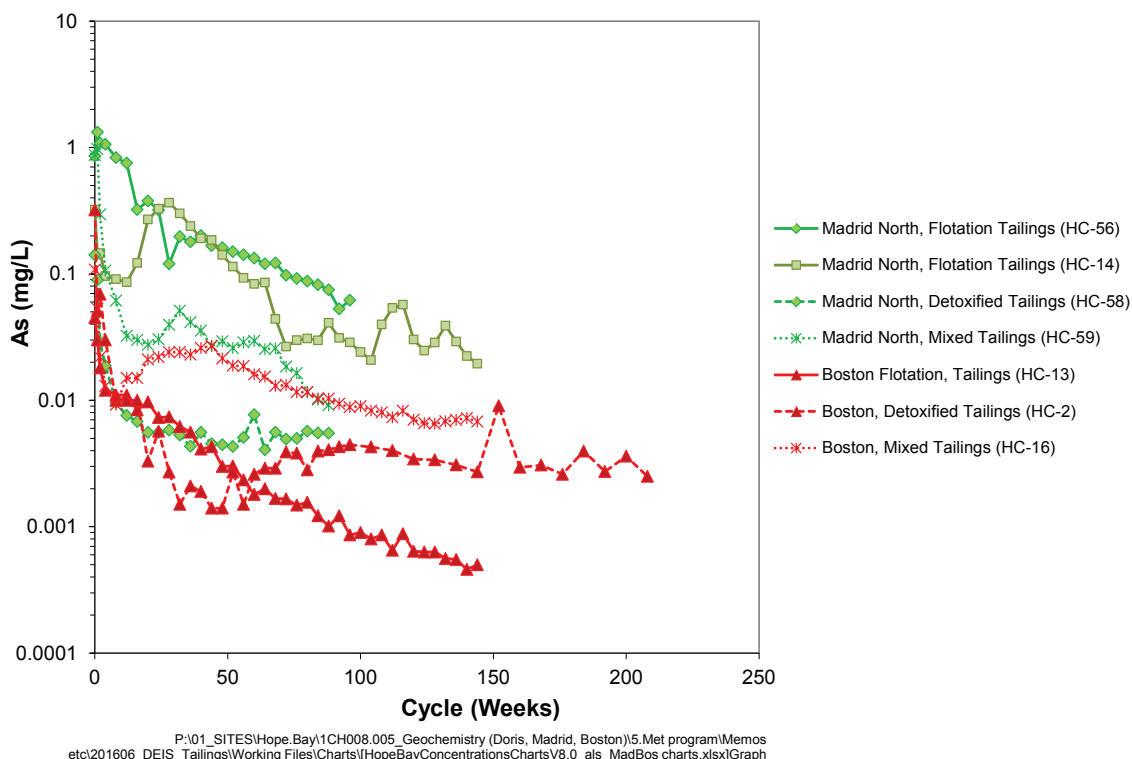
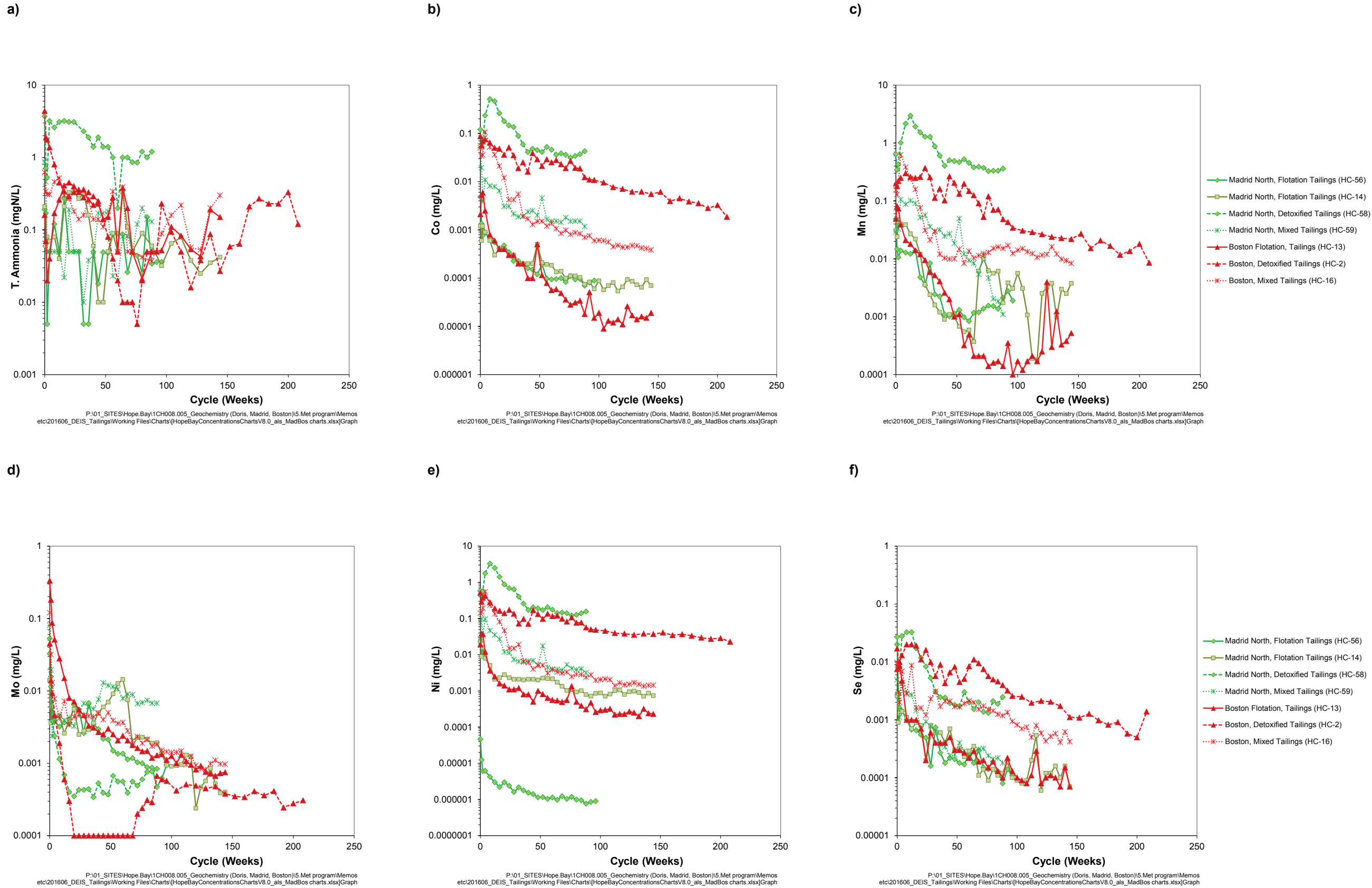


Figure 4.8: Arsenic Levels in Humidity Cell Test Leachates, Madrid North and Boston

- Ammonia:
 - Ammonia levels in the Madrid North detoxified tailings were significantly higher than in the mixed and flotation tailings. Levels in the Boston detoxified tailings were higher in the initial flush but decreased to comparable levels with the Boston mixed and flotation tailings as testing progressed (Figure 4.9).
 - In general, flotation tailings would be expected to have lower cyanide levels in comparison to the other tailings because they would not contain any of the cyanide degradation products (Figure 4.9). During mining, ammonia may be present in all components of the tailings due to the presence of residual ANFO from blasting, but at levels lower than the detoxified tailings.
- Cobalt, manganese, nickel and selenium levels appear to be related to tailings type, with detoxified tailings > mixed tailings > flotation tailings (Figure 4.9). This suggests that leaching of these elements may be related to sulphide content and oxidation. Other noteworthy trends for these parameters include:
 - Cobalt and manganese levels were typically higher for Madrid North than Boston.
 - Nickel levels from the Madrid North flotation tailings sample from Naartok West (HC-56) were much lower than the Madrid North composite sample (HC-14).

- Molybdenum levels appear to be related to tailings type, with mixed tailings > flotation tailings > detoxified tailings (Figure 4.9).

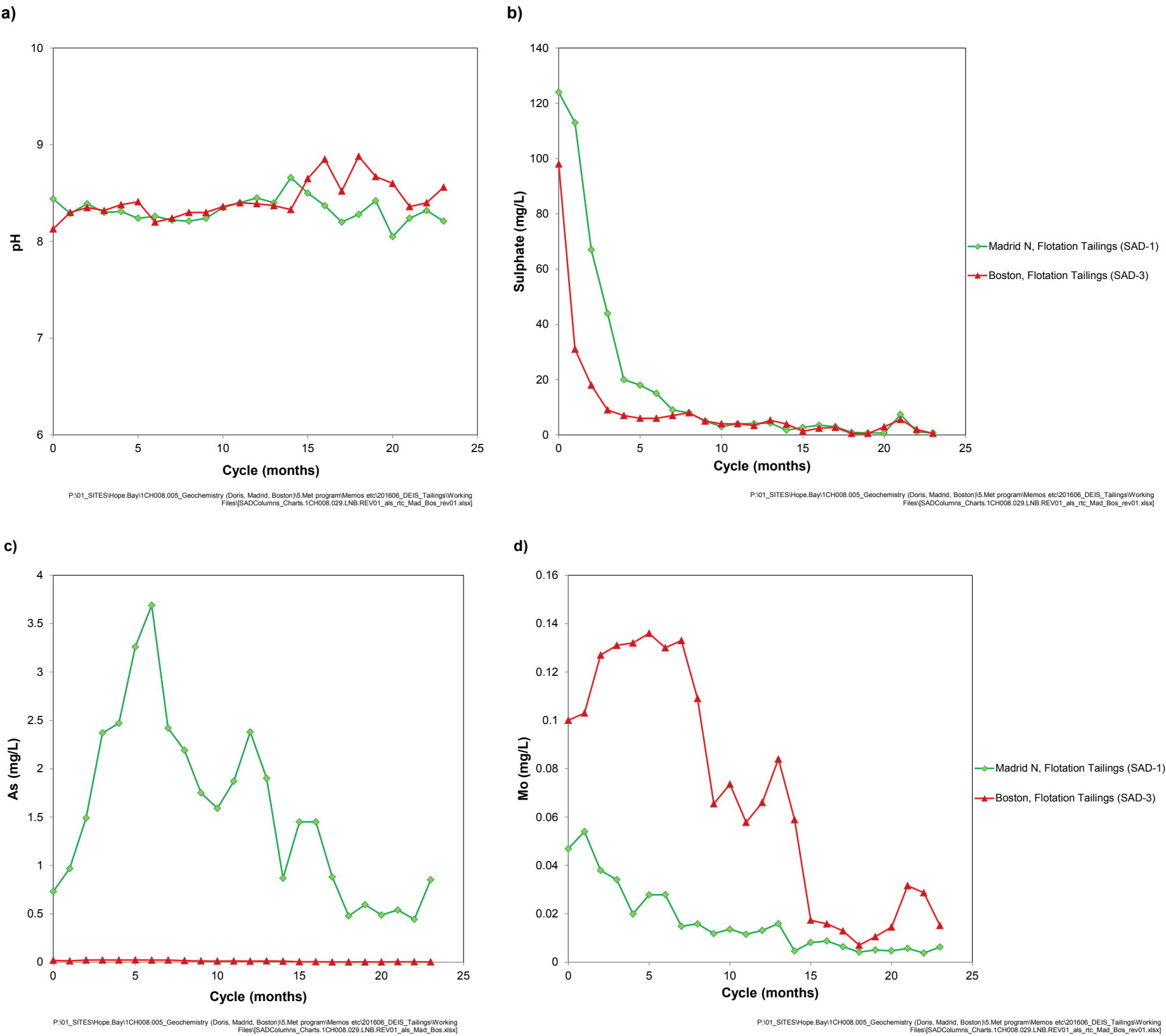
Following the termination of humidity cell testing, analyses on humidity cell test residues were conducted including ABA and ICP-metals. A comparison of the initial sample and final residues is provided in Appendix I.



4.4 Sub-Aqueous Column Tests

Summaries of key results data and figures for the sub-aqueous columns are provided in Appendix J and Appendix K. The solids characteristics of the Madrid North and Boston flotation tailings samples in the sub-aqueous columns were discussed in Sections 4.1 and 4.2. The sub-aqueous column test data are summarized as follows:

- Leachate pH in the sub-aqueous columns remained alkaline (pH 8 to 9) with relatively similar levels of sulphate throughout testing (Figure 4.10).
- Trace metals were generally comparable between the Madrid North and Boston flotation tailings samples for most parameters of interest, with the exception of arsenic and molybdenum.
- Arsenic levels in the Madrid North flotation tailings sample were substantially higher (by nearly two orders of magnitude) than the Boston flotation tailings (Figure 4.10). However, arsenic concentrations were considered elevated in both columns and at concentrations higher than the corresponding humidity cell tests.
- Molybdenum was notably higher in the Boston flotation tailings than Madrid North for the first 15 months of testing and thereafter relatively comparable (Figure 4.10).



4.5 Process Water Analyses

Analysis of the tailings process water or supernatant produced during metallurgical testing is provided in Table 4.9 for selected parameters. The complete analysis results are provided in Appendix L. No process water was available for Madrid South.

Metal levels were screened against the CCME guidelines for aquatic life to identify parameters with elevated levels. This screening was for demonstrative purposes only and is not meant to indicate anticipated exceedances in tailings pond water. Source terms for tailings are presented in SRK (2016d). The metallurgical process data are summarized as follows:

- In all solutions, pH conditions were slightly alkaline and within typical guidelines.
- Sulphate concentrations were lowest in the flotation tailings solutions (20 to 300 mg/L) and highest in the detoxified tailings solution (500 mg/L), with concentrations for the mixed tailings solutions typically between the flotation and detoxified tailings (300 to 400 mg/L). Notably lower sulphate was reported in process water from the Boston flotation tailings, particularly the 2011 sample, compared to the Madrid North flotation tailings.
- Total and WAD cyanide were highest in process water from the detoxified tailings and lowest in flotation tailings, as expected.
- Elevated ammonia was noted in the mixed tailings and detoxified tailings solutions. High detection limits for the flotation tailings samples limited data interpretation; however, cyanide and its degradation products (including ammonia) are not part of the flotation tailings process.
- Arsenic levels were elevated in all tailings samples. Higher arsenic concentrations were observed in the Madrid North flotation solutions compared to Boston, as seen in the humidity cell tests (Section 4.3).
- Selenium levels were elevated in all tailings samples with the exception of the 2011 Boston flotation tailings samples. Higher selenium concentrations were observed in the Madrid North flotation solutions compared to Boston, as seen in the humidity cell tests (Section 4.3).
- Cadmium and chromium levels were elevated for most tailings samples; however, selected samples could not be assessed due to high detection limits.
- Molybdenum levels were elevated in flotation and detoxified tailings for both Madrid North and Boston.
- Nickel levels were elevated in selected Madrid North flotation tailings samples, and all mixed and detoxified tailings samples from both deposits.
- Copper and iron levels were elevated in the mixed and detoxified tailings samples.
- Zinc, aluminum, silver and mercury levels were also elevated in selected samples. Selected samples could not be assessed for silver and mercury due to high detection limits.
- The Boston 2011 flotation tailings sample generally had higher trace metal concentrations than the 2008 sample, possibly due to variations in ore feed and/or process optimization.

Table 4.9: Analytical Results of Madrid North and Boston Metallurgical Process Water

Parameter	Units	CCME	Flotation Tailings					Mixed Tailings		Detoxified Tailings
			Madrid North			Boston		Madrid North	Boston	Boston
			Naartok West	Naartok East	Suluk	2008	2011	Naartok West		
pH	units		8.6	8.5	8.1	8.0	8.5	7.9	8.1	8.1
Alkalinity	mgCaCO ₃ /L		170	160	180	130	230	230	350	110
SO ₄	mg/L		220	310	280	120	20	290	420	510
TDS	mg/L		640	730	870	350	240	1000	930	1400
F	mg/L	120	0.18	0.12	0.03	0.35	0.2	0.12	0.15	--
Total CN	mg/L		--	--	--	--	0.13	9.9	2.3	41
WAD CN	mg/L		--	--	--	--	0.01	4.3	0.01	13
NH ₃	as N mg/L	0.26	1	1	1	1	0.11	0.78	2	1.3
NO ₂	as N mg/L	0.06	0.02	0.02	0.02	0.04	0.01	0.05	0.03	0.06
NO ₃	as N mg/L	2.9	0.05	0.05	0.05	0.06	0.01	0.05	0.33	0.06
Ag	mg/L	0.00025	0.00005	0.00005	0.00005	0.00005	0.00017	0.0005	0.0005	0.014
Al	mg/L	0.1	0.05	0.15	0.05	0.05	1.2	0.05	0.01	0.02
As	mg/L	0.005	1	0.98	0.44	0.0079	0.011	0.64	0.021	4.5
Ca	mg/L		34	48	71	45	24	44	160	56
Cd	mg/L	0.00009	0.00021	0.00021	0.00025	0.00043	0.00026	0.0002	0.00002	0.0003
Co	mg/L		--	--	--	--	--	--	--	2.3
Cr	mg/L	0.001	0.015	0.013	0.0095	0.0002	0.0045	0.002	0.0053	0.05
Cu	mg/L	0.002	0.0012	0.001	0.001	0.001	0.012	2.1	0.022	11
Fe	mg/L	0.3	0.05	0.081	0.05	0.065	0.34	1.3	0.3	3.3
Hg	mg/L	0.000026	0.0001	0.0001	0.0001	0.0001	0.000037	0.0001	0.0000094	0.0001
Mg	mg/L		42	65	89	27	18	54	120	9.8
Mn	mg/L		0.018	0.025	0.021	0.019	0.029	0.024	0.075	0.031
Mo	mg/L	0.073	0.086	0.099	0.1	0.16	0.041	0.099	0.067	0.33
Ni	mg/L	0.025	0.024	0.028	0.037	0.0057	0.0034	0.29	0.028	5.2
Pb	mg/L	0.001	0.0001	0.0001	0.0001	0.0001	0.0007	0.001	0.0004	0.002
Sb	mg/L		0.025	0.012	0.0066	0.002	0.0029	0.018	0.018	1.8
Se	mg/L	0.001	0.012	0.011	0.015	0.0012	0.0007	0.0031	0.01	0.2
Zn	mg/L	0.03	0.0074	0.0084	0.012	0.0037	0.036	0.0098	0.058	0.01

Notes:

- blue italics = value less than laboratory detection limit. Detection limit shown.
- Bold values = values exceed screening criteria (CCME Guidelines for Freshwater Aquatic Life – Long-term Concentration).
- denotes data not available. Cyanide species not determined for flotation tailings because they do not contain cyanide.

4.6 Aging Tests

The raw data from the oxic and anoxic tailings slurry aging tests are presented in Appendix M. Graphs showing concentrations over time are presented in Appendix N.

Aging tests were completed on process water from the Madrid North and Boston flotation tailings, the Madrid North and Boston mixed tailings, as well as the Boston detoxified tailings. No aging tests were completed for Madrid South.

Apparent trends observed in the oxic and anoxic aging test data are outlined as follows:

- All solutions remained alkaline (~pH 8) throughout testing. Slight increases in pH with aging were observed in the Boston flotation tailings (2008) (up to pH~9) and the Madrid North (Naartok East) flotation tailings slurries (up to pH~10).
- Increases in sulphate and to a lesser degree magnesium, with oxic aging were observed for all three tailings types. In the anoxic tests, sulphate remained constant with aging with the exception of the detoxified tailings slurry (Boston) where sulphate increased with time. Other major ion concentrations (calcium, sodium and potassium) remained constant in both the oxic and anoxic tests.
- Decreases in total and WAD cyanide with aging in both the oxic and anoxic tests containing detoxified tailings (Boston) and mixed (Boston and Madrid North) tailings. This is an indication of degradation of residual cyanide degradation in the samples.
- Increases in total ammonia with aging in both the detoxified tailings (Boston) and mixed (Boston and Madrid North) tailings oxic and anoxic tests. Total ammonia is a degradation product of cyanide.
- No apparent increases in trace metals were observed with aging.
- Decreases in trace metal concentrations with oxic and anoxic aging included arsenic, copper, nickel and selenium. These decreases were more apparent in the detoxified and mixed tailings slurries than the flotation tailings samples. Concentrations for these parameters typically remained above the CCME guideline for freshwater aquatic life after aging.
- Concentrations for cadmium, chromium and molybdenum remained relatively constant with oxic and anoxic aging in all three tailings types.

5 Summary and Conclusions

TMAC plans to use the detoxified tailings as backfill in the underground mine workings, and to deposit flotation tailings in tailings areas at Doris and Boston. Therefore, under the current mine plan, there will be no mixed tailings. The focus of this summary is on the geochemical characteristics of the tailings streams that will be managed as part of the Project.

ARD classifications were related to tailings types with flotation tailings classified as non-PAG and detoxified tailings as PAG. Sulphur content was also related to tailings type with total sulphur content higher in the detoxified tailings. For the flotation tailings only, sulphur levels were also related to deposit area, with sulphur content for Madrid South typically lower than Boston, which was lower than Madrid North. Pyrite was the primary sulphide mineral in all tailings types from all deposit areas. Trace sulphide mineralogy for the Madrid North tailings samples determined that gersdorffite was present in all tailings types, with chalcopyrite, millerite, and pyrrhotite present in the detoxified tailings.

There is no kinetic test data available for Madrid South. Boston was determined to be the most geochemically appropriate and conservative geochemical analog for Madrid South flotation tailings. For Madrid South detoxified tailings, Boston or Madrid North samples are appropriate analogs.

The pH of all humidity cell tests remained neutral to alkaline for the duration of the tests. A humidity cell test containing detoxified tailings from Doris is the only sample from the Project to develop acidic conditions, and did so almost four years into operation (SRK 2015).

Arsenic leaching is the primary metal leaching concern for both Madrid North and Boston and was highest for the Madrid North flotation tailings. Arsenic leaching was not related to tailings type, sulphide content or arsenic content. Results from the Hope Bay waste rock humidity cell test program (e.g. SRK 2016c) suggested a relationship between arsenic leaching and the presence of the trace sulphide mineral gersdorffite. Gersdorffite was identified at trace levels in all Madrid North tailings samples suggesting that this may also be a control on arsenic leaching. Trace mineralogical data were not available for the Boston samples.

Sulphate, cobalt, manganese, nickel and selenium leaching appear to be related to tailings type, with rates from detoxified tailings greater than flotation tailings, suggesting that leaching is controlled by sulphide content. Leaching of cobalt and manganese was typically higher for Madrid North than Boston.

Cyanide is a reagent additive that is part of the milling process thus explaining the presence of total and WAD cyanide in the detoxified tailings process water only. Decreases in total and WAD cyanide were observed over the duration of both the oxic and anoxic tests indicating degradation of residual cyanide in the samples. Ammonia is a degradation product of cyanide thus explaining the elevated ammonia levels in the mixed tailings and detoxified tailings process water.

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Appendix A – Methodology for Sub-Aqueous Column Tests

Memorandum

To:	Kelly Sexsmith	Date:	17 March 2009 Revised from 19 January 2009
cc:		From:	John Chapman
Subject:	Tailings Testing Program Saturated Column Testing Procedures	Project #:	SRKNAC Task 026

1 Terms of Reference

Consideration is being given to various disposal options for tailings from the Newmont Hope Bay Project. Above ground and below water deposition strategies are being considered, together with options for combined or separate disposal of flotation tailings and flotation concentrate. The above ground (i.e. unsaturated conditions) will be assessed using humidity cell tests. The below water conditions will be significantly different to the unsaturated conditions, and saturated column tests are being proposed to assess the potential for solute release from the tailings under these conditions.

Under field conditions, the depth of the water over the tailings will dictate the potential for oxygen entry into the saturated tailings (e.g. by wind assisted mixing of the water column to oxygenate the overlying water column together with diffusion into the tailings). This may be enhanced by advective transport of water into the tailings if there is a net hydraulic gradient across the tailings layer. For these conditions we believe oxygen delivery to the tailings may be calculated based on the prevailing storage conditions, and utilizing the oxidation data, solute release could be calculated. For the purpose of this assessment, the intent is to determine the potential mobility of solute under saturated but anoxic conditions.

This memorandum describes the testing requirements for saturated column tests to allow assessment of equilibrated porewater quality in the tailings under conditions of fully saturated and anoxic conditions. Whilst marine disposal is uncertain at this time, the test procedure described herein may be adapted by replacing the water with seawater should this be required.

2 Sample and Preparation

We understand that the tailings products are being stored fully saturated and refrigerated at approximately the slurry density at which they were produced, and that about 2.5 L of slurry about 40 % (wt) solids is available for testing. Assuming dry bulk densities of 1.7 and 2.5 for the flotation tailings (SG of about 2.6) and concentrates (SG of about 4 to 5) respectively, the volume of solids available for testing would range from approximately 0.6 to 0.75 L, with the volume for the combined tailings falling within this range. For the purpose of uniformity in the test protocol, we propose that the tests be completed in 0.5 L columns, which should leave a small amount of solids for further characterization, should it be required.

Charging the columns will require that the supernatant be decanted from the solids. The saturated tailings solids are then to be loaded into the columns as described below.

3 Apparatus and Set-up Method

The apparatus required for testing will comprise:

- Short, PVC columns (3 inch diameter x 5 inch height), with end-caps equipped with outlets
- sealable header “bladder tank” (about 2L capacity), or, sealable flask with an inlet/outlet arrangement to maintain an inert gas overpressure to ensure anoxia.
- flexible tubing (about 3 m) suitable for attaching to the column in and outlet, and the header tank outlet
- isolation valves
- 250 mL syringe if required
- Glovebox (and nitrogen gas to purge the glovebox)

Each column should have an internal diameter of 3 inches and an overall height of about 5 inches, with a net internal volume of about 500 mL. The column is to be equipped with two caps that have a central outlet that will allow tubing to be connected to the outlet/inlet. The weight of column together with the end-caps and the attached tubing should be obtained prior to commencing the test.

The base of the column is to be sealed with an end cap equipped with an outlet in the centre of the cap to which a tube is connected and clamped off. A fine mesh filtration ‘plate’ (3 to 4 nylon mesh (#200) disks cut to the inside diameter of the columns) is then placed at the base of the column.

In preparation for transferring the tailings or concentrate solids into the column, the slurry is placed in a suitably sized beaker or graduated cylinder and the solids are allowed to settle. The **clear** supernatant is then carefully decanted leaving only the saturated solids. The column is then charged with the tailings solids by carefully pouring or spooning the tailings into the column to about an eighth of an inch below the top of the cylinder. Another set of nylon mesh discs are then placed on top of the tailings, and the top end cap is sealed in position. The weight of the charged column is then determined.

The tube from the base of the column is connected to the bladder or header tank, and the tube from the top of the column is sealed into a glove box where the discharge porewater sample can be collected anoxically. This will achieve an upward displacement of porewater through the tailings so that poregases are readily displaced from the tailings during set-up. A bladder header tank is used to allow the container to collapse as the water flows from the tank and does not draw air into the system.

The bladder header tank would be used to store the source water under anoxic conditions, and will be elevated (> 1 m above column) to provide the head to displace porewater as required. In the event that the permeability of the tailings is low and the hydraulic head that can be provided by the header tank is insufficient to displace the porewater, the 250 mL syringe may be used to “draw” the water through the tailings to achieve a porevolume displacement. *The use of a peristaltic pump may also be considered to assist flow, however, due to the small scale of the tests the flows involved are low and care should be taken that the pump does not over-pressurise the system leading to tubing popping off connectors or breaking of column end-cap seals and compromising the test procedure. The recommended displacement rates should also not be exceeded.*

4 Procedure

Based on the estimated tailings volume and an estimated porosity of about 0.5, the tailings pore volume should be about 250 mL. The intent would be to allow the tailings porewater to equilibrate with the tailings before it is displaced. We would recommend a contact time of between 2 and 4 weeks; with a longer contact time preferred. The testing procedure therefore should proceed as follows:

1. De-ionised water should be boiled and immediately placed in a glovebox (maintained anoxic with an overpressure of nitrogen) and allowed to cool. This should remove most of the dissolved oxygen, but de-aeration could be enhanced by bubbling nitrogen through the water for 4 to 6 hours. Then, still working in the glovebox, the de-aerated water should be transferred into the bladder tank and the tank should be sealed. The pH and redox of the water should be measured.
2. After the column has been set-up and charged with the tailings, the outlet tube should be sealed and the header tank should be raised to pressurise the column. The column should be allowed to stand for at least 24 hours and checked for any leaks, which should be repaired before proceeding. Once the column has been shown to be water tight, proceed to step 3.
3. Displace one porevolume from the column either by allowing about 250 mL of the water to pass through the tailings under gravity, or withdrawing that amount with the syringe, within the glovebox.
4. The column effluent should be passed through a 0.3 micron filter to remove any suspended solids. (Whilst the first displacement water would be expected to be similar to the decant that was removed from the tailings samples, but should nonetheless be analysed.) The sample pH, redox and conductivity are to be measured within the glove box under anoxic conditions. Sufficient sample should be removed and preserved for metals analysis by ICP, and the balance should be submitted for sulphate and alkalinity/acidity as applicable.
5. The column is allowed to stand undisturbed and 'pressurised' (i.e. under static head from the header tank to prevent oxygen ingress) for the prescribed contact period.
6. At the end of the contact period repeat Steps 3, 4 and 5 until the required number of pore volume displacements had been achieved as discussed below.

The number of porevolumes will be determined from the observed changes in the leachate that is generated. Possible mechanisms controlling the rate of the release may be as follows.

First, a general 'washout' curve would be expected for the more mobile solutes such as sodium, potassium and magnesium. Although EC can be used to track the washout of the more soluble solutes, chemical analyses will be used to confirm the washout. Ideally the tests would be continued until the solute has decreased to less than 5 % of the initial concentration.

Second, in some cases, it is possible that equilibrium conditions may be observed with respect to finite quantities of secondary minerals which will limit the concentration of some parameters (e.g. sulphate from gypsum dissolution). In this case the solute concentration would remain constant (approximately) for consecutive pore volume displacements but for a limited time period. It is possible that in some cases a slow decline is observed as the 'source' is depleted (i.e. less surface area for dissolution as smaller crystals are completely dissolved and only larger ones remain) over time. This will more clearly show up in the detailed analytical results. Again, the intent would be to continue the test until the concentration has declined to < 5 % of the initial concentration.

Third, there may be some ongoing generation or slow rate of dissolution that may occur that may take a very long time to deplete (e.g. slow dissolution of amorphous silicates). Determination of dissolution of such phases would be beyond the scope of this test.

The number of pore volumes will therefore be dictated by one of the first two factors, whichever is the longest.

Appendix B – SRK Aging Test Protocol

Memo

To:	Charles Bucknam (Newmont Metallurgical Services)	Date:	Revised November 10, 2008
cc:	Chris Hanks (Newmont Mining Corporation); Kelly Murphy (Newmont Metallurgical Services); Oxic and Anoxic Aging Test Protocols: Doris Central and Boston Metallurgical Tests, Hope Bay Project - DRAFT	From:	Lisa Barazzuol (SRK Canada) John Chapman (SRK Australia) Kelly Sexsmith (SRK Canada)
		Project #:	1CH008.005

This memo provides detailed instructions for the oxic and anoxic aging tests to be conducted on tailings slurry samples from the Doris, Madrid and Boston deposits. Ageing tests are to be conducted for all tailings types, including flotation and cyanide detoxified tailings and a combination of these tailings types (called combined tailings). Specific details of each aging test are included in the attached aging test protocols. The protocols have been reviewed by Charles Bucknam of Newmont Metallurgical Services (NMS) and Linda Figueroa of the Colorado School of Mines, both of whom have provided comments that have been included in the test methods.

NMS will be managing and conducting the ageing tests at their facility and in collaboration with Tom Wildeman of the Colorado School of Mines.

ANOXIC AGING TEST PROCEDURE

DORIS, MADRID AND BOSTON DEPOSITS, HOPE BAY PROJECT

1 Objective

The purpose of the test is to assess potential changes in the porewater quality of the deposited tailings over time.

2 Sample aliquot preparation

Each batch of slurry should be thoroughly mixed. Four aliquots (1.25 L each) should be prepared for each tailings slurry samples. The splitting protocol should be performed under anoxic conditions inside of a glove bag or box and must ensure that all replicates are as similar as possible. 1.25 L of sample are to be aliquoted into a 2 L container. Samples are to be purged with nitrogen for one hour while in a glove bag that is also purged. Purged samples are to be sealed, gently swirled, allowed to site for one hour, then purged again for one hour.

3 Method

The four replicates will be transferred to 1.25 L airtight vessels under a nitrogen to ensure anoxic conditions are maintained. These samples will then be placed in a glove bag that is continuously purged with nitrogen and stored at 4°C. Once a month, all of the replicates should be gently mixed to bring the tailings into suspension. The use of a continuous nitrogen purge will alleviate the need to periodically monitor the glove box for oxygen intrusion. Evaluation of oxygen intrusion is required if a monthly nitrogen purge is used. Commercially available oxygen absorber and indicator products can be used to facilitate and monitor low oxygen concentrations, respectively.

Tailings samples will be removed and analyzed at regular intervals. A schedule for each of the time steps is provided in Table 1. At each time step, the redox potential, conductivity and pH of all of the replicates (unfiltered samples only) should be recorded. These measurements should be completed within a glove box to ensure that oxygen is not introduced to the anoxic samples. Step 3 below outlines the sampling procedure and the list of analytes.

Table 1. Sampling and Analysis Schedule for the Standard Anoxic Aging Test

Aliquot Label	Approx. Time Elapsed (months)
A	1
B	2
C	4
D	8

4 Sampling and Analyses

The aliquot to be analyzed should be purged with nitrogen (as for all other aliquots), and then allowed to sit for a minimum of 24 hours. All necessary sample preparation steps (filtering, sample preservation, etc.) should be conducted within a glove box to ensure no oxygen is introduced to the sample. Flotation tailings leachate should be analyzed for the parameters listed in Table 2 where as cyanide detoxified and combined tailings leachate samples should be analyzed for the parameters listed in Table 3. As there may be insufficient supernatant volume, the last column in Tables 2 and 3 indicates the assay priority.

Each aliquot from the original sample should be labelled with their original name plus a modifier indicating the aliquot (A,B,C...), and date of filtration (eg. “DC-CNdestruct-A (filtered December 20, 2007)”).

The moist solids from these samples should be retained in a sealed container and stored under refrigeration until further notice. Do not air dry the samples. The samples should be labelled with their original name plus the time of filtration (e.g. “DC-CNdestruct-A (solids – filtered October 2, 2008)”).

Table 2. Analytes for Anoxic Ageing Test – Flotation Tailings

Test	Max DL ¹	Units	Volume of Sample needed	Assay Priority
pH (unfiltered)	0.5	pH Units	Unpreserved 250-mL	A
Eh (unfiltered)	50	mV	Unpreserved 250-mL	
pH (filtered)	0.5	pH Units	Unpreserved 250-mL	
EC	0.5	µS/cm	Unpreserved 250-mL	
Total alkalinity	0.5	mg CaCO3/l	Unpreserved 250-mL	
Bicarbonate	0.5	mg CaCO3/l		
Carbonate	0.5	mg CaCO3/l		
Hydroxide	0.5	mg CaCO3/l		
Sulphate	1	mg/L	Unpreserved 250-mL	
Total organic carbon	1	mg/L	H2SO4 50-mL	
Total inorganic carbon	1	mg/L	H2SO4 50-mL	
Total carbon	1	mg/L	H2SO4 50-mL	
ICP-MS	trace level	ug/ml	HNO3 100-mL	
Hg by CVAF	0.02	ug/l	BrCl 50-mL	
Chloride	0.2	mg/l	Unpreserved 250-mL	
Acidity	0.5	mg CaCO3/l	Unpreserved 250-mL	D
TDS	30	mg/l	Unpreserved 250-mL	
Dissolved Phosphorous	0.005	mgP/l	HNO3 100-mL	
¹ As reported by Cantest Lab				

Table 3. Analytes for Anoxic Ageing Test – Cyanide Detoxified and Combined Tailings

Test	Max DL ¹	Units	Volume of Sample needed	Assay Priority
All parameters in Table 2			see Table 2	
Nitrate (NO ₃ -N)	0.02	mg/l	Unpreserved 250-mL	A
Nitrite (NO ₂ -N)	0.002	mg/l	Unpreserved 250-mL	
Ammonia (NH ₃ -N)	0.01	mgN/l	Unpreserved 250-mL	
Total CN	0.01/0.002	mg/l	NaOH 50-mL	
WAD-CN	0.01/0.002	mg/l	NaOH 50-mL	
Free-CN	0.01/0.002	mg/L	NaOH 50-mL	C
SCN (Thio cyanate)	0.02	mg/l	Unpreserved 250-mL	B
CNO (Cyanate)	1	mg/l	Unpreserved 250-mL	B

¹As reported by Cantest Lab

OXIC AGING TEST PROCEDURE

DORIS, MADRID AND BOSTON DEPOSITS, HOPE BAY PROJECT

1 Objective

The purpose of this test is to determine the initial rate of degradation of cyanide and cyanide degradation products, and potential other changes in the tailings pond water quality in the short term.

2 Sample aliquot preparation

Each batch of slurry should be thoroughly mixed. Four aliquots (1.25 L each) should be prepared from each of the tailings slurry samples. The splitting protocol must ensure that all replicates are as similar as possible. hourly T readings for oxic tests if samples in window w/o T control.

3 Method

Ideally, the four replicates should be held at 10 to 15° C and should be exposed to natural light if possible and in such a way that there is little risk of dust entering the system. The container coverings should allow light to pass through. If temperature control in the prescribed range is not possible, then hourly temperature readings should be recorded and the aspect of the window noted.

Tailings samples will be removed and analyzed at regular intervals. A schedule for each of the time steps is provided in Table 4. Step 3 below outlines the sampling procedure and the list of analyses.

Table 4. Sampling and Analysis Schedule for the Standard Oxic Aging Test

Aliquot Label	Approx. Time Elapsed (<u>weeks</u>)
A	1
B	2
C	4
D	8

4 Sampling and Analyses

Flotation tailings leachate should be filtered and submitted for analysis of the parameters outlined in Table 5 where as cyanide detoxified and combined tailings should be analyzed according to Table 6.

Each aliquot from the original sample should be labelled with their original name plus a modifier indicating the aliquot (A,B,C...), and date of filtration (eg. “BOS-CNdestruct-A (filtered October 6, 2008)”).

The moist solids from these samples should be retained in a sealed container and stored under refrigeration until further notice. Do not air dry the samples. The samples should be labelled with their original name plus the time of filtration (e.g. “BOS-CNdestruct-A (solids – filtered October 6, 2008)”).

Table 5. Analytes for Oxidic Ageing Test – Flotation Tailings

Test	Max DL ¹	Units	Volume of Sample needed	Assay Priority
pH (unfiltered)	0.5	pH Units	Unpreserved 250-mL	A
Eh (unfiltered)	50	mV	Unpreserved 250-mL	
pH (filtered)	0.5	pH Units	Unpreserved 250-mL	
EC	0.5	µS/cm	Unpreserved 250-mL	
Total alkalinity	0.5	mg CaCO3/l	Unpreserved 250-mL	
Bicarbonate	0.5	mg CaCO3/l		
Carbonate	0.5	mg CaCO3/l		
Hydroxide	0.5	mg CaCO3/l		
Sulphate	1	mg/L	Unpreserved 250-mL	
Total organic carbon	1	mg/L	H2SO4 50-mL	
Total inorganic carbon	1	mg/L	H2SO4 50-mL	
Total carbon	1	mg/L	H2SO4 50-mL	
ICP-MS	trace level	ug/ml	HNO3 100-mL	
Hg by CVAF	0.02	ug/l	BrCl 50-mL	
Chloride	0.2	mg/l	Unpreserved 250-mL	
Acidity	0.5	mg CaCO3/l	Unpreserved 250-mL	D
TDS	30	mg/l	Unpreserved 250-mL	
Dissolved Phosphorous	0.005	mgP/l	HNO3 100-mL	
¹ As reported by Cantest Lab				

¹As reported by Cantest Lab

Table 6. Analytes for Oxidic Ageing Test – Cyanide Detoxified and Combined Tailings

Test	Max DL ¹	Units	Volume of Sample needed	Assay Priority
All parameters in Table 2	see Table 2			
Nitrate (NO ₃ -N)	0.02	mg/l	Unpreserved 250-mL	A
Nitrite (NO ₂ -N)	0.002	mg/l	Unpreserved 250-mL	
Ammonia (NH ₃ -N)	0.01	mgN/l	Unpreserved 250-mL	
Total CN	0.01/0.002	mg/l	NaOH 50-mL	
WAD-CN	0.01/0.002	mg/l	NaOH 50-mL	
Free-CN	0.01/0.002	mg/L	NaOH 50-mL	C
SCN (Thio cyanate)	0.02	mg/l	Unpreserved 250-mL	B
CNO (Cyanate)	1	mg/l	Unpreserved 250-mL	B

¹As reported by Cantest Lab

Appendix C – Colorado School of Mines Aging Test Protocol

Tailings Treatment Project

Thomas Wildeman

March 19, 2009

Splitting Procedure after Four Trials

Approximate time needed for complete procedure: 4-5 hours. Two people are needed to pour the slurry into the splitter. Otherwise most procedures need one person.

I. Preliminary Splitting and Sampling

A. Introduction

Three materials will be subjected to the aging test protocol:

1. Flotation tailings (labeled BFT in subsequent sections), these should be barren material and have not been subjected to the cyanide process. They serve as a baseline for comparing the test results from the other materials. Also, because these materials may be used for other mitigation procedures, the results will uncover any contaminants that are released from these materials that may cause future problems.

2. Tailings that are produced after the cyanide leaching and cyanide destruction have been carried out (labeled CNDT in subsequent sections). This material could have remnant cyanide, as well as cyanide complexes and degradation products, in solution. In addition the solid material will contain pyrite as well as other sulfides.

3. A combination of the two types of tailings (labeled mixed or MT in subsequent sections). The combination of the materials would be in such a proportion as to represent a combined tailings facility. The hypothesis is that such a combination may provide the lowest operational cost.

At least 20 liters of materials will be received in 20 liter plastic containers. This material will need to go through a preliminary splitting and sampling to generate subsamples for analysis and for the aging studies (the splitting and preparation of these samples is described in the later sections.).

B. Prepare the following before the splitting procedure.

1. A clean and dry 5 liter pail and cover. Label the pail with the full name of the tailings material, the type of split (5 L), and the date of the splitting.

C. Performing the preliminary split

1. For the 20 L pail that contains the most amount of tailings slurry, thoroughly mix the slurry in the original container using an industrial stirrer. Then immediately pour about 4.5 liters into the 5 liter container..

2. Firmly cap the 5 L pail and take it to the hood in the analytical preparation lab. Allow it to sit for at least one day so that the slurry will settle as much as possible.

3. Firmly cap the 20 L pail and set it aside for the procedures described in the following sections.

D. Prepare the following before the sampling procedure for decant water.

1. Two clean 1 L polyethylene bottles to be used for decant water to clean the splitter, and two clean 1.0 L polyethylene bottles for decant water that will be used for later procedures. Also, have available a clean 500 or 600 mL polyethylene beaker for decanting water to be filtered.

2. Round up all of the new and clean bottles that are needed to receive the subsamples that are needed for all of the tests listed in Table A for the BFT tailings and for the tests listed in both Tables A and B for the CNDT and MT tailings.

3. MAKE CERTAIN THAT THE PROPER PRESERVATIVES ARE AVAILABLE AND READY TO BE ADDED TO THE PROPER BOTTLES IN THE PROPER AMOUNTS.

4. For those analyses that are time sensitive, inform the labs that samples will be coming.

5. Round up a pH meter, Eh meter, and conductivity meter. Check out the probes on the meters to ensure that they are functioning properly and can be calibrated.

6. Have available acidity and alkalinity kits for these analyses.

7. Mark all of the sample bottles. Use the following marking procedure: Use Tailings ID Deposit (B, DC, NE, NW or S), bulk flotation (BFT), cyanidation detoxed (CNDT), or mixed (MT) tails, decant solution (DS), 0 (for the initial sampling) Sampling Date (Example: B-BFT-DS-0-20081128).

E. Analytical Note and Sampling Procedures

It is assumed that for all of the analyses listed in Tables 1 and 2, the decant solution does not have to be nitrogen purged but it is better to immediately filter the solution and add the proper amounts to the bottles and then the preservatives. Consequently, no glove bags are needed for the preparation of decant water and slurry for analytical procedures. However, it may be necessary to let the 5 L slurry pail sit for at least one day so that the solids settle.

1. Prepare a new filter system. 115 mL disposable filters have been ordered for this purpose.

2. Carefully remove the lid off the 5 L pail so as not to disturb the decant water and remove 500 mL in a clean beaker.

3. Filter 250 mL of decant water and pour this into the 2 carbon (40 mL amber vials) ICP (125 mL polyethylene bottle), and mercury (60 mL amber glass) sample bottles; leave one 40-mL amber vial unpreserved and add 0.5 mL of H_2SO_4 , 1 mL HNO_3 , and 1 mL of $BrCl$, respectively, to the other containers. Submit for analysis according to Table 1

Note: if precipitation occurs with the nitric acid addition, discard that split and submit the unpreserved sample below for metals analyses after digestion.

4. If CNDT and MT tailings are being prepared, pour 50 mL into the 60 mL amber glass cyanide analysis bottle. Have available NaOH for preservation. Submit for analysis according to Table 2

5. Finally, filter another 250 mL into the polyethylene bottle and this unpreserved sample will be used for the pH, alkalinity, acidity, ammonia, Eh, EC, and IC analyses.

6. After these samples are taken, put the proper preservative into each bottle.

F. Final measurements and Decant Water Removal

1. Calibrate the meters.

2. Pour out 200 mL of decant water for immediate measurements, and, if needed, another 100 mL of water for an alkalinity measurement
3. Then pour out 2 L of decant water for use in the splitting procedure and two 500 mL portions of decant water to be used in the anaerobic test procedure. If some solids are transferred, that is not a problem.
4. Place the pH, Eh, and EC probes into the 200 mL of decant water and take measurements of the respective parameters. Take three readings of each of the parameters. If there appears to be a trend in the readings take more readings until the probe has settled upon a value. For Eh, there may never be a settling of the readings, and if this happens, use the best estimate of what the final reading will be.
5. Next perform an alkalinity measurement. Depending on the pH and ionic conductivity readings, take 25 to 100 mL of the slurry and titrate it with the appropriate solution of H_2SO_4 .
6. Finally, replace the lid on the 5 L pail; and store it and the decant water bottles in an appropriate place for further analyses and procedures.

G. Analytical Note and Sampling for the analyses on the solid materials

Because the tailings materials are fine grained and may weather if exposed to an oxygen environment, it should be the case that the solids should not be filtered and allowed to dry. At Newmont, procedures are in place to vacuum filter or to use a filter press to generate semi-dry solids. If such facilities are not available, then the solids will be split into appropriate subsamples using a modified quartering procedure and put into containers that can be sealed so that the materials remain moist. Then the analytical labs that receive the samples can decide if filtering and drying the material is appropriate.

1. Determine the suitable water and air tight containers for the solid materials and label them using the standard protocol. Use Tailings ID Deposit (B, DC, NE, NW or S), bulk flotation (BFT), cyanidation detoxed (CNDT), or mixed (MT) tails, solids (SS), Preparation Date (Example: B BFT SS, 20081128).

2. Open the 5 L pail and pass it through the rotary splitter to obtain a nominal 1-kg humidity cell charge, a 250-g SPLP/TCLP charge and a nominal 1-kg characterization charge.

3. Filter the humidity cell charge, vacuum seal, label and place in freezer for shipment to CANTEST and save the filtrate..

4. Filter the SPLP/TCLP charge, place in a wide mouth bottle, submit for analysis and save filtrate.

5. Filter the characterization charge and save the filtrate. Dry the solids and ring grind. Rotary divide into 4 nominal 250-g portions and submit for NCV Confirmation to analytical, mineralogy and microbiology and one split to CANTEST for ABA and metals.

II. Preparation for Aging Studies Splitting

A. Do the following before the splitting can be done:

1. Have available 3 glove bags for the refrigerator
2. Prepare the refrigerator so that nitrogen is flowing into the refrigerator and the glove bags are in the refrigerator. Also install a thermocouple into the refrigerator in

such a way that the readout connector is outside the refrigerator and temperature can be read without opening the door. Also, test the refrigerator to see if the purge nitrogen can escape without blowing open the door.

B. Pre-clean the 2 L polycarbonate bottles as follows:

1. Make about 2 L of 10 % by volume nitric acid; the proportions do not have to be exact.
2. To each polycarbonate bottle, add 500 mL of the 10 % nitric acid. Cap the bottles and shake thoroughly. 30 minutes later, shake the bottle again. 30 minutes later pour out the nitric acid and save it for further washes of equipment.
3. Rinse each bottle three times with deionized water. Turn over onto paper towels and let the bottles and caps dry overnight.
4. With this precleaning and drying, the tailings slurry can be poured directly into the bottles with no rinsing with decant water needed.

C. Clean the slurry splitter the afternoon before the procedure so that it is dry and ready to be used the next day. Also, locate the large plastic carts and wash off the tops so that they can be used for sample preparation.

D. Label all 12 of the receiving bottles Use the following marking procedure: Use the following marking procedure: Tailings ID Deposit (B, DC, NE, NW or S), bulk flotation (BFT), cyanidation detoxed (CNDT) or mixed (MT) tails, aliquot (1, 2, 3, 4), Splitting Date, Anoxic (A-), Oxidic (O-), or Column (C-) (Example: DC-BFT-1-20090204-O). There will be 4 2.0 L amber wide-mouthed bottles for the anoxic aging samples, 4 2.0 L narrow mouthed polycarbonate bottles for the oxidic aging test, and 4 wide-mouthed 2.5 L polypropylene bottles for the column tests.

E. Have 2 L of decant or filtrate water, which was gathered from the preliminary sampling described in Part I, available.

F. Also have the following supplies available.

1. A roll of red flexible tape,
2. Drinking straws for propping open the aerobic lids,
3. Two glove bags each with 4 to 6 large binder clips.
4. A roll of teflon tape for glove bag port sealing.

G. Prepare the two glove bags for the sparging procedure as follows:

1. Put the two glove bags on the carts below the two sparging tubes.
2. Make certain that both tubes are switched to nitrogen.
3. Place the tubes in the glove bags so that at least 18 inches is inside the bag. Tape the tube inlet with Teflon tape so that only minor amounts of nitrogen will flow out.
4. Place a plastic bottle that contains 500 mL of decant water into the bag.
5. Into one of the bags, place the oxygen meter probe. Leave the meter outside of the bag. Use the Hach meter that has a solid state detector.
6. Seal the bag with bindery clips and allow 15 minutes for the bag to be purged of oxygen.

7. After the bags have been purged, purge the bottles of decant water for 15 minutes, and then seal tightly.

III. Splitting Procedure

A. With a clean splitter, pour 1.0 L of decant water into the splitter to wash the splitter with the sample material.

B. Place the 12 bottles around the splitter, and note that the first bottles to be processed will be for the anaerobic study.

C. Mix the slurry in the 20 L bucket from the preliminary splitting using an industrial stirrer

D. Pour the slurry from the plastic bucket into the splitter, using the standard procedures for the splitter. After the 15 L has completely flowed through the splitter, wash the plastic bucket three times using 1 L of the decant water. Each time, pour the wash into the splitter.

IV. Preparation of Anoxic Samples

A. As soon as possible, remove the four 2 L bottles; cap the bottles that will not be immediately sparged; and sparge the others with nitrogen gas inside of a glove bag using the N₂ line by the flotation table. If possible, use the following sparging procedure.

1. Open the two glove bags and put two amber bottles into each of the glove bags. Remove the bottle of 500 mL of decant water.

2. Sparge two samples simultaneously at the two sparging stations using two four foot lines of ¼ inch ID tygon coming off each nitrogen station. Place two bottles in each of the glove bags.

2. Put the tygon line to the bottom of the 2 liter bottle and flow N₂ through the line so that there is a continuous stream of bubbles flowing through the slurry. Put the bottle lid loosely over the gas line.

3. Sparge for 30 minutes or until the oxygen indicator shows that the bottle has been purged of oxygen. Do this by placing the O₂ probe in the top of the bottle. Then cap that bottle, and repeat the sparging on the second bottle for 30 minutes or until the oxygen indicator shows that the bottle has been purged of oxygen. Then, cap the second bottle and repeat the sparging on the first bottle for another 15 minutes. Tightly cap the first bottle and repeat the sparging on the second bottle for 15 minutes. Finally tightly cap the second bottle.

4. After sparging is finished, make certain the bottles are tightly capped, and then remove them from the glove bag. Wrap each lid with flexible red tape, leaving a tab at the end so that the tape can be easily removed in the glove bag.

B. Place the bottles in the refrigerator in the proper glove bag, and ensure that N₂ is flowing through the glove bag. Store the bottles in the refrigerator until all the preparations for preparing samples for the anoxic study are completed.

V. Preparation of the Oxidic Samples

A. Next, remove the four oxidic bottles. Cap the bottles and roll them for ten minutes to ensure homogenization of the sample. The square bottles can be rolled by placing them in a 2 foot length of 6 inch PVC pipe. Place a portion of flexible drinking straw over the lip of the bottle. Place the lid over the straw, and place the bottle on the south facing window sill where the environment will be sunny and the temperature will vary between 15 and 25 °C. Mark the slurry level in the bottle. Then in case of evaporation, the original volume can be restored by adding deionized water.

B. Preparing to Take Oxidic Samples

1. Oxidic Aging Samples will be taken at 1, 2, 4, and 8 week intervals. The procedure to be followed is essentially the same as that for taking the initial sample. The labeling will be change slightly. The procedure follows.

2. Round up all of the new and clean bottles that are needed to receive the subsamples that are needed for all of the tests listed in Table A for the BFT tailings and for the tests listed in both Tables A and B for the CNDT and MT tailings.

3. MAKE CERTAIN THAT THE PROPER PRESERVATIVES ARE AVAILABLE AND READY TO BE ADDED TO THE PROPER BOTTLES IN THE PROPER AMOUNTS.

4. For those analyses that are time sensitive, inform the labs that samples will be coming.

5. Round up a pH meter, Eh meter, and conductivity meter. Check out the probes on the meters to ensure that they are functioning properly and can be calibrated.

6. Have available acidity and alkalinity kits for these analyses.

7. Mark all of the sample bottles. Use the following marking procedure: Use Tailings ID Deposit (B, DC, NE, NW or S), bulk flotation (BFT), cyanidation detoxed (CNDT), or mixed (MT) tails, decant solution (DS), 1,2,3,4, (for the sampling period) Sampling Date-O (for oxidic), (Example: B-BFT-DS-2-20081128-O).

C. Analytical Note and Sampling Procedures

It is assumed that for all of the analyses listed in Tables 1 and 2, the decant solution does not have to be nitrogen purged but it is better to immediately filter the solution and add the proper amounts to the bottles and then the preservatives. Consequently, no glove bags are needed for the preparation of decant water and slurry for analytical procedures.

1. Prepare a new filter system. 115 mL disposable filters have been ordered for this purpose.

2. Carefully remove the the appropriate oxic aging bottle from the window sill so as not to disturb the decant water and remove 500 mL in a clean beaker.

3. Filter 250 mL of decant water and pour this into the 2 carbon (40 mL amber vials) ICP (125 mL polyethylene bottle), and mercury (60 mL amber glass) sample bottles; leave one 40-mL amber vial unpreserved and add 0.5 mL of H_2SO_4 , 1mL HNO_3 , and 1 mL of BrCl , respectively, to the other containers. Submit for analysis according to Table 1.

Note: if precipitation occurs with the nitric acid addition, discard that split and submit the unpreserved sample below for metals analyses after digestion.

4. If CNDT and MT tailings are being prepared, pour 50 mL into the 60 mL amber glass cyanide analysis bottle. Have available NaOH for preservation. Submit for analysis according to Table 2.

5. Finally, filter another 250 mL into the polyethylene bottle and this unpreserved sample will be used for the pH, alkalinity, acidity, ammonia, Eh, EC, and IC analyses.

6. After these samples are taken, put the proper preservative into each bottle.

D. Final measurements and Decant Water Removal

1. Calibrate the meters.

2. Pour out 200 mL of decant water for immediate measurements, and, if needed, another 100 mL of water for an alkalinity measurement.

3. Place the pH, Eh, and EC probes into the 200 mL of decant water and take measurements of the respective parameters. Take three readings of each of the parameters. If there appears to be a trend in the readings take more readings until the probe has settled upon a value. For Eh, there may never be a settling of the readings, and if this happens, use the best estimate of what the final reading will be.

4. Next perform an alkalinity measurement. Depending on the pH and ionic conductivity readings, take 25 to 100 mL of the slurry and titrate it with the appropriate solution of H_2SO_4 .

5. Finally, replace the cap on the bottle and return it to the window sill until the aging study is completed..

VI. Preparation of the Column Bottles

The final four 2.5 L bottles will be used for column studies. For these, polypropylene bottles are sufficient. The slurry will be transferred to a 4 L narrow mouth IP2 polypropylene bottle for shipment to the Cantest Laboratory. To do this, homogenize the slurry in the 2.5 L bottles and then quickly pour the slurry into the bottle using a large plastic funnel. Place the bottle in the refrigerator and ship it on ice to the Cantest laboratory when cool.

Analysis Requirement Tables

Table 1. Analytes for Aging Test – Flotation Tailings

Test	Max DL ¹	Units	Volume of Sample needed	Assay Priority
pH (unfiltered)	0.5	pH Units	Unpreserved 250-mL	A
Eh (unfiltered)	50	mV	Unpreserved 250-mL	
pH (filtered)	0.5	pH Units	Unpreserved 250-mL	
EC	0.5	µS/cm	Unpreserved 250-mL	
Total alkalinity	0.5	mg CaCO3/L	Unpreserved 250-mL	
Bicarbonate	0.5	mg CaCO3/L		
Carbonate	0.5	mg CaCO3/L		
Hydroxide	0.5	mg CaCO3/L		
Sulphate	1	mg/L	Unpreserved 250-mL	
Total organic carbon	1	mg/L	H2SO4 50-mL	
Total inorganic carbon	1	mg/L	H2SO4 50-mL	
Total carbon	1	mg/L	H2SO4 50-mL	
ICP-AES	0.05	Mg/L	HNO3 100-mL	
ICP-MS (NMS Aquo)	trace level	ug/mL	HNO3 100-mL	
Hg by CVAf	0.02	ug/L	BrCl 50-mL	
Chloride	0.2	mg/L	Unpreserved 250-mL	
Acidity	0.5	mg CaCO3/L	Unpreserved 250-mL	D
TDS	30	mg/L	Unpreserved 250-mL	
Dissolved Phosphorous	0.005	mgP/L	HNO3 100-mL	
¹ As reported by Cantest Lab				

Table 2. Analytes for Aging Test – Cyanide Detoxified and Combined Tailings

Test	Max DL ¹	Units	Volume of Sample needed	Assay Priority
All parameters in Table 2	see Table 2			
Nitrate (NO ₃ -N)	0.02	mg/L	Unpreserved 250-mL	A
Nitrite (NO ₂ -N)	0.002	mg/L	Unpreserved 250-mL	
Ammonia (NH ₃ -N)	0.01	mgN/L	Unpreserved 250-mL	
Total CN	0.01/0.002	mg/L	NaOH 50-mL	
WAD-CN	0.01/0.002	mg/L	NaOH 50-mL	
Free-CN	0.01/0.002	mg/L	NaOH 50-mL	C
SCN (Thiocyanate)	0.02	mg/L	Unpreserved 250-mL	B
CNO (Cyanate)	1	mg/L	Unpreserved 250-mL	B
S204 and S406	1	mg/L	Unpreserved 250-mL	A
¹ As reported by Cantest Lab				

Tailings Treatment Project

Thomas Wildeman
Revision after three trials March 19, 2009

Preparing the Samples for the Anoxic Aging Study

Approximate time needed for complete procedure: 4 hours. Two people are needed for portions of this task.

I. Preparation

- A. Before the study, have the following supplies available.
 - 1. Two rolls of red flexible tape,
 - 2. Two front opening glove bags,
 - 3. A hood with two nitrogen lines so that each bag has a separate nitrogen line
 - 4. 4 to 5 anaerobic bags of appropriate size equipped with an iron oxide O₂ absorber and an O₂ indicator.
 - 5. 4 to 5 1.25 L wide-mouthed amber bottles
 - 6. A Mylar tape dispenser
 - 7. 20 large binder clips for sealing glove bags and anaerobic bags
 - 8. Two magic markers.
- B. Store the 2 L bottles of slurry in the refrigerator purged with nitrogen until all the supplies are available.
- C. Mark all of the 1.25 amber bottles before the preparation procedure. Use the following marking procedure: Tailings ID Deposit (B, DC, NE, NW or S), bulk flotation (BFT), cyanidation detoxed (CNDT) or mixed (MT) tails, aliquot (1, 2, 3, 4), Splitting Date, Anoxic (A) (Example: DC-BFT-1-20090204-A).
- D. Have 2-500 mL containers of decant water available. It will probably be taken from the top of the bulk sample.
- E. Placing everything in the glove bag is too cumbersome. So, after struggling with the procedure the first time, the following method is suggested where one bottle is prepared and then the bag is opened and supplies are switched out for the second bottle. Place the following in each of the two glove bags for the first anaerobic bottle preparation.
 - 1. One anaerobic bag.
 - 2. One 1.25 L amber bottle with the cap loosely on the bottle
 - 3. A container of 500 mL of decant water
 - 4. An 8 x 10 inch plastic pan for spillage
 - 5. 4 medium binder clips
 - 6. A roll of red tape with the end loosened
 - 7. One pack of 2 oxygen absorbers with indicators

8. Two squares of paper toweling
9. A pair of scissors.

II. Make-up of the Anoxic Bottles

A. Seal the glove bags with binder clips and then turn on the nitrogen and purge both glove bags for 15 minutes. To ensure nitrogen flow, have the reducing valve at the tank set at a minimum of 20 psi, and have the flow through the meter off scale and open to the point where the gas flow can be heard (this is about halfway open). If the decant water was not previously purged, purge it at this time. Also, make certain the 1.25 L bottle is in the plastic spillage pan.

B. Take a 2 L amber bottle from the refrigerator, and shake it vigorously until all of the solids have been suspended in the decant water. Do splits 3 and 4 first to make certain they receive the freshest oxygen absorbers and are placed at the back of the glove bag. Remove the red sealing tape and shake again. While one person is still shaking the bottle, another person takes the binder clips from one of the glove bags and removes the cap from the 1.25 L bottle. Meanwhile, the other person quickly uncaps the large amber bottle, moves it into the glove bag, and pours the suspension into the small bottle filling it to the tip top. If there is still headspace in the small bottle after all the suspension has been poured in, then top off the suspension with some decant water.

C. Quickly reseal the glove bag with the binder clips. Then tightly cap the small bottle, and wrap the lid with red tape. Place the bottle in the anaerobic bag, put in the nitrogen line, roll the top of the bag and clip one side with two binder clips so that N_2 can flow from the bag. Sparge the bag for 10 minutes, remove the N_2 line and place the third binder clip on the rolled top so that the anaerobic bag is sealed.

D. Open the glove bag and remove the anaerobic bag with the bottle inside. Apply a gentle pressure to the bag so that some of the contained nitrogen is released. Then, seal the bag with Mylar tape. Place the anaerobic bag in the controlled atmosphere refrigerator.

E. Return to the open glove bag and put into it another anaerobic bag and amber bottle. Also, if decant water was not needed in for the first bottle, then remove it because water will not be needed for the future bottles. Purge the bag for 15 minutes.

F. While the first bag is being re-purged, go through parts B, C, and D using the second glove bag. Then re-supply the second bag as in part E.

G. After the second bottle has been prepared, then go back to the first glove bag and fill the third bottle.

H. After the third bottle has been prepared, then go back to the second bag and fill the fourth bottle.

I. When all four bottles have been finished, place them in a glove bag in the refrigerator. Make certain nitrogen is flowing through the glove bag and that it is sealed well

enough with binder clips such that it puffs out slightly. To ensure nitrogen flow, have the reducing valve at the tank set at a minimum of 20 psi, and have the flow through the meter off scale. Then, set the flow through the glove bag at 2 SCFH for the first day. Check the refrigerator and glove bag the second day, and if everything is in order, reduce the flow to 0.5 SCFH.

Tailings Treatment Project

Thomas Wildeman
Revision after three trials 04-20-09

Sampling for the Anoxic Aging Study

Approximate time needed for complete procedure: 4 hours. One person can do this task. This should be done in a glove bag to ensure that nothing will precipitate if the solution is exposed to oxygen and because the ORP reading will change once the slurry is exposed to air.

I. Preparation

- A. Before the study, have the following supplies available.
 - 1. One front opening glove bag,
 - 2. A hood with a nitrogen line,
 - 3. Two 115 mL vacuum filter setups, make certain the plugs on the pour spouts have been loosened.
 - 4. Two 250 mL wide-mouth HDPE bottles
 - 5. A small DI water squirt bottle
 - 6. A hand vacuum pump
 - 7. A pH / millivolt meter with an ORP probe that has been calibrated.
- B. Mark the two 250 mL bottles. Use the following marking procedure: Tailings ID Deposit (B, DC, NE, NW or S), bulk flotation (BFT), cyanidation detoxed (CNDT) or mixed (MT) tails, aliquot (1, 2, 3, 4), Sampling Date, Anoxic (A) FIL (Example: DC-BFT-1-20090204-A-FIL).
- C. Although cumbersome, place everything in the glove bag. Because filtering water in the glove bag is difficult, find a stand to put the 115 mL filter system in so that it will not fall down.

II. Preparing the Water Samples

- A. Take the appropriate aging sample (1, 2, 3, or 4) from the refrigerator, remove from the anaerobic bag, remove the red tape, and place it in the glove bag taking care not to agitate the sample. Inspect the anaerobic bag, the oxygen indicator, and the oxygen absorber bag to see if the sample has remained free of oxygen. Seal the glove bags with binder clips and then turn on the nitrogen and purge the glove bag for 15 minutes. To ensure nitrogen flow, have the reducing valve at the tank set at a minimum of 20 psi, and have the flow through the meter off scale and open to the point where the gas flow can be heard (this is about halfway open).
- B. CAUTION: WITH SO MANY ITEMS IN THE GLOVE BAG, BOTTLES EASILY TIP OVER, SO MAKE CERTAIN THAT ALL BOTTLES ARE IMMEDIATELY CAPPED AFTER USE.

C. With the filter setup secured in the stand, open the sample bottle and pour in the appropriate amount of decant water, and then put the cap on the aging sample bottle to prevent spillage. Attach the vacuum pump and give a few pumps, allow the water to be filtered. After filtering, remove the plug on the pour spout. Set the 250 mL bottle in a secure place, and remove the cap. Carefully pour the filtered water into the bottle and immediately replace the cap. Repeat this procedure until 500 mL of water has been filtered. If the filter system becomes clogged, then use the second 115 mL filter system.

D. After filtering, rinse the ORP probe and put it into the slurry sample bottle. From what has been learned so far, it is probably the case that the ORP reading will drift to a low value and may never stabilize. If this occurs, then take an ORP reading every 10 minutes for an hour to determine the drift and a possible final value.

III. Taking the Various Water Samples

A. Prepare the following before the sampling procedure for decant water.

1. Round up all of the new and clean bottles that are needed to receive the subsamples that are needed for all of the tests listed in Table 2 of the SRK testing procedure for the BFT tailings and for the tests listed in both Tables 2 and 3 for the CNDT and MT tailings.
2. **MAKE CERTAIN THAT THE PROPER PRESERVATIVES ARE AVAILABLE AND READY TO BE ADDED TO THE PROPER BOTTLES IN THE PROPER AMOUNTS.**
3. For those analyses that are time sensitive, inform the labs that samples will be coming.
4. Round up a pH meter and conductivity meter. Check out the probes on the meters to ensure that they are functioning properly and can be calibrated.
5. Have available acidity and alkalinity kits for these analyses.
7. Mark all of the sample bottles. Use the following marking procedure: Use Tailings ID Deposit (B, DC, NE, NW or S), bulk flotation (BFT), cyanidation detoxed (CNDT), or mixed (MT) tails, decant solution (DS), aliquot (1, 2, 3, 4), Sampling Date, Anoxic (A) (Example: B-BFT-DS-2-20081128-A).

B. Analytical Note and Sampling Procedures

1. It is assumed that for all of the analyses listed in Tables 2 and 3 of the SRK testing procedure, that the decant solution filtered in the glove bag will not change as long as the various aliquots are preserved immediately.
2. From the one 250 mL bottle of decant water, pour this into the carbon (40 mL amber vial) ICP (75 mL into a 125 mL polyethylene bottle), and mercury (60 mL amber glass) sample bottles; add 0.5 mL of H_2SO_4 , 1 mL HNO_3 , and 1 mL of $BrCl$, respectively. The remainder of the solution will be placed into a 40 mL amber glass bottle with no preservative for an inorganic carbon analysis. Submit for analysis according to Table 1.
3. If CNDT and MT tailings are being prepared, pour 50 mL into the 60 mL amber glass cyanide analysis bottle. Have available NaOH for preservation. Submit for analysis according to Table 2.
4. Finally, with the other 250 HDPE bottle take samples for IC analyses and alkalinity or acidity.

5. After these samples are taken, put the proper preservative into each bottle. .
If precipitate forms on nitric acid addition, discard the nitric acid split and submit the unpreserved sample for analysis of the metals after digestion.

C. Final measurements

1. Calibrate the meters.
2. Pour out 200 mL of the decant water for pH and ionic conductivity measurements, and, if needed, another 100 mL of water for an alkalinity measurement. There may not be enough filtered water for all of the measurements. If this is the case, decant water from the anaerobic sample bottle.

3. Place the pH, and EC probes into the 200 mL of decant water and take measurements of the respective parameters. Take three readings of each of the parameters. If there appears to be a trend in the readings take more readings until the probe has settled upon a value.

4. Next perform an alkalinity measurement. Depending on the pH and ionic conductivity readings, take 25 to 100 mL of the slurry and titrate it with the appropriate solution of H₂SO₄.

6. Finally, put what ever slurry is left back into the refrigerator. There are no solid analyses prescribed in Tables 2 and 3 of the SRK testing procedure. However, the moist solids should be stored in a refrigerator just in case further analyses are requested.

Analysis Requirement Tables

Table 1. Analytes for Anoxic Ageing Test – Flotation Tailings

Test	Max DL ¹	Units	Volume of Sample needed	Assay Priority
pH (unfiltered)	0.5	pH Units	Unpreserved 250-mL	A
Eh (unfiltered)	50	mV	Unpreserved 250-mL	
pH (filtered)	0.5	pH Units	Unpreserved 250-mL	
EC	0.5	µS/cm	Unpreserved 250-mL	
Total alkalinity	0.5	mg CaCO3/L	Unpreserved 250-mL	
Bicarbonate	0.5	mg CaCO3/L		
Carbonate	0.5	mg CaCO3/L		
Hydroxide	0.5	mg CaCO3/L		
Sulfate	1	mg/L	Unpreserved 250-mL	
Total organic carbon	1	mg/L	H2SO4 50-mL	
Total inorganic carbon	1	mg/L	Unpreserved 50-mL	
Total carbon	1	mg/L	H2SO4 50-mL	
ICP-AES	0.05	mg/L	HNO3 100-mL	
ICP-MS (NMS Aquo)	trace level	ug/mL	HNO3 100-mL	
Hg by CVAf	0.02	ug/L	BrCl 50-mL	
Chloride	0.2	mg/L	Unpreserved 250-mL	
Acidity	0.5	mg CaCO3/L	Unpreserved 250-mL	D
TDS	30	mg/L	Unpreserved 250-mL	
Dissolved Phosphorous	0.005	mgP/L	HNO3 100-mL	

¹As reported by Cantest Lab

Table 2. Analytes for Anoxic Ageing Test – Cyanide Detoxified and Combined Tailings

Test	Max DL ¹	Units	Volume of Sample needed	Assay Priority
All parameters in Table 2	see Table 2			
Nitrate (NO ₃ -N)	0.02	mg/L	Unpreserved 250-mL	A
Nitrite (NO ₂ -N)	0.002	mg/L	Unpreserved 250-mL	
Ammonia (NH ₃ -N)	0.01	mgN/L	Unpreserved 250-mL	
Total CN	0.01/0.002	mg/L	NaOH 50-mL	
WAD-CN	0.01/0.002	mg/L	NaOH 50-mL	
Free-CN	0.01/0.002	mg/L	NaOH 50-mL	C
SCN (Thiocyanate)	0.02	mg/L	Unpreserved 250-mL	B
CNO (Cyanate)	1	mg/L	Unpreserved 250-mL	B
S204 and S406	1	mg/L	Unpreserved 250-mL	A
¹ As reported by Cantest Lab				

Appendix D – Mineralogy Reports

Mineralogy for HC-56, HC-58 and HC-59

NEWMONT MINING CORPORATION

**Semiquantitative Mineralogy by XRD and Sulfide
Characterization by MLA for Forty-three Ore and
Waste Composites from Various Sites in Hope Bay
undergoing Humidity Cell Testing**



Plato Malozemoff Technical Facility

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May 9, 2011



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Memorandum

TO: C. Bucknam/Inverness

FROM: D. Lopez/Inverness

File 11486
MI 207561, 209144, 210052,
210117, 210172, 210173

DATE: February 10, 2011

COPY: D. Brosnahan/Inverness
D. Doerr/Inverness
K. M. Le Vier/Inverness
D. Snyder/Inverness
L. Barazzuol/SRK

SUBJECT: Semiquantitative Mineralogy by XRD and Sulfide Characterization by MLA for Forty-three Ore and Waste Composites from Various Sites in Hope Bay undergoing Humidity Cell Testing

SUMMARY

XRD (X-ray diffraction) and MLA (Mineral Liberation Analyzer) were used to characterize forty-four environmental composites from various sites in Hope Bay undergoing humidity cell testing. Samples were analyzed by XRD for bulk semiquantitative mineralogy and analyzed by MLA for characterization of any sulfides detected. MLA was able to detect trace amounts of sulfide, commonly unaccounted for by XRD due to detection limits, and supply mineral associations and free surface amounts from detected sulfides. MLA used the Extended Back-Scattered Electron (XBSE) method; an extended liberation analysis where back-scattered electron (BSE) images are collected and segmented based on a range of gray levels. A copper standard was used in establishing a gray scale due to the similar gray levels of the complex mixed gangue found in the samples. This elevated the contrast between gray levels optimizing the segmentation of gangue, which is necessary for a more accurate account of mineral association. Pyrite's (the predominate sulfide detected in most samples) particle size was given by percent passing values P_{50} (50% passing) and P_{80} (80% passing) in microns, ranging from 25-905 μ m; <1%-40% is the range of encapsulated pyrite. Pyrite's crystal morphology was classed as anhedral, subhedral, and euhedral; in addition pyrite particles were described as either coarse and/or fine-grained, whether there was dissemination in gangue, and whether particles had sieve texture.

INTRODUCTION

Forty-three ore and waste composites from different sites in Hope Bay undergoing humidity cell testing were submitted by C. Bucknam for identification of mineral content by XRD and sulfide characterization by MLA. Mineral weight percents, sulfide mineral associations, sulfide encapsulation, size and morphology of pyrite (the predominate sulfide detected in most of the

samples), calculated and measured assays, and back scattered electron images from MLA, are given for each composite.

DISCUSSION

Experimental

Analytic pulps of the samples were initially analyzed by XRD for semiquantitative mineralogy. Table I shows major and minor phases identified by XRD, with quantities determined by Rietveld refinement, whole pattern fitting, and based on chemical analyses. Table III shows measured chemical analyses used to aid XRD identifications, and to check XRD quantity estimates.

The samples were then analyzed by MLA (Mineral Liberation Analyzer), which uses a SEM (scanning electron microscope) with EDS (energy dispersive X-ray spectrometers) and automated quantitative mineralogy software, to detect trace minerals with a focus in characterizing sulfides. Five grams from each sample were mounted and slurried in epoxy, polished, and carbon-coated for MLA analysis. Most samples were analyzed at a ¼" mesh size (four samples were analytic pulps, -500 mesh) using the Extended Back-Scattered Electron (XBSE) measurement. MLA/XBSE is an extended liberation analysis where back-scattered electron (BSE) images are collected and segmented based on gray levels. An EDS spectrum is then collected for each segmented gray level image or "phase" and matched to a standards (mineral) list by pattern fitting.

Gold is commonly used as a standard to establish a gray level scale because of its brightness. Due to the similar gray levels of the complex mixed gangue found in the samples, copper was used to establish the gray scale. This elevated the contrast between gray levels which optimized the segmentation of gangue.

Data Analysis

Each sample is detailed with a brief description which includes the following:

- Major and minor minerals detected by XRD and MLA.
- Mineral weight percentages for any sulfide detected by MLA.
- Mineral associations of sulfides (≥ 0.01 wt%) detected by MLA.
- Encapsulation of sulfide quantities (≥ 0.01 wt%) determined by MLA.
- Particle size of pyrite, given by percent passing values P_{50} (50% passing) and P_{80} (80% passing), in microns.
- Pyrite's crystal morphology.

Mineral Content

XRD and MLA mineral weight percentages are given in a table for each sample (Table II contains MLA mineral weight % for all samples, Table V contains mineral key). The minerals are listed based on highest to lowest weight % by MLA, which were in accordance with XRD quantities for most samples. Sulfides detected by MLA are in bold. Calculated assays from MLA weight % for each sample are included in Table IV.

XRD and MLA shows the predominate gangue in these samples are silicates (quartz, albite, chlorite, muscovite/sericite, K-feldspar, and paragonite) and carbonates (ankerite, siderite, and calcite). XRD quantities of major and minor phases should be regarded when comparing with MLA's quantities for gangue; similar gray levels were still not fully segmented by MLA even though a Cu standard was used to optimize segmentation. XRD only detected pyrite when it was ~1% or higher, whereas trace amounts were detected by MLA.

There were eleven sulfide phases detected in this suite of samples: pyrite (FeS_2), chalcopyrite (CuFeS_2), gersdorffite ($(\text{Fe}, \text{Co}, \text{Ni})\text{AsS}$), pyrrhotite ($\text{Fe}_{(1-x)}\text{S}$), arsenopyrite (FeAsS), galena (PbS), cobaltite (CoAsS), millerite (NiS), sphalerite (ZnS), tetradymite ($\text{Bi}_2\text{Te}_2\text{S}$), and tetrahedrite (Cu_3SbS_3). Pyrite was the predominate sulfide followed by chalcopyrite.

Sulfide Mineral Associations

A table showing mineral associations was created for each sample, for any sulfides detected by MLA. The values represent the percentage of the periphery length in which a sulfide is associated (touching) with another phase. There is a "free surface" column which represents the percent of the sulfide that is exposed (touching epoxy). The last column in the table is "OTHER", this percentage represents the sum of phases which had <1% association with each sulfide detected in the sample.

Sulfide Encapsulation

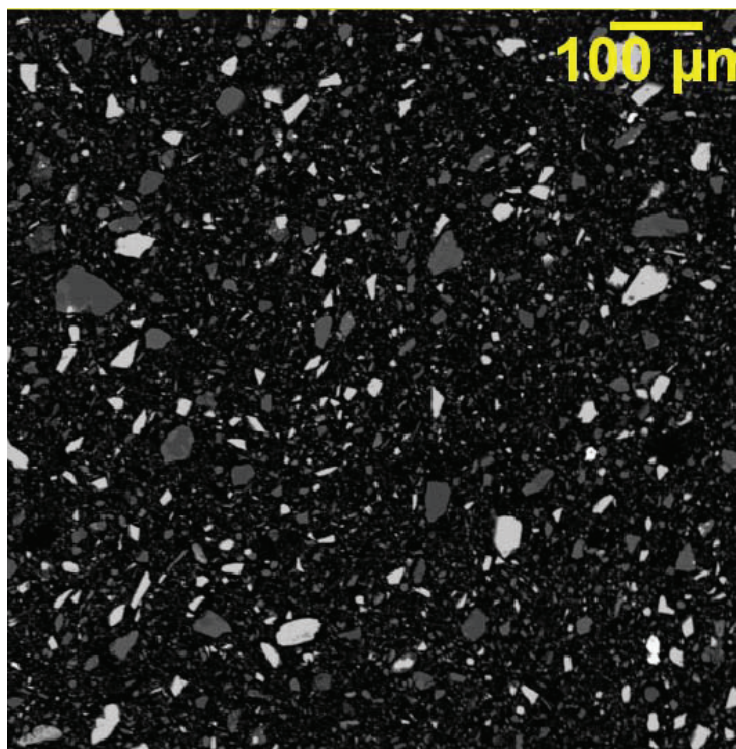
A table showing sulfide encapsulation was created for each sample, for any sulfides detected by MLA. The values represent the percentage of sulfide that occurred in grains that were present in the following three categories:

- 1) encapsulated (0% exposed)
- 2) liberated (100% exposed)
- 3) intermediate exposure ($0\% < x < 100\%$)

This can be useful for determining potential oxidation of sulfides. For example, it may be assumed that sulfide that was completely encapsulated will not oxidize, which could help explain disagreements between humidity cell test results and anticipated results based on sulfur chemical analyses. Encapsulation was based on two-dimensional images, which could be exaggerated due to possible exposure in the third dimension.

NW CNDT SS 20100602 (HC-58) - Predominately composed of pyrite (~40%) and ankerite (~27%) with lesser amounts of quartz, chlorite, muscovite/sericite, albite, and rutile. Pyrite wt% by MLA (41.93%) was greater than XRD's value (30%); according to total sulfur value (18.66%) from chemical analyses pyrite's wt% is more likely ~35%. MLA also detected trace amounts of chalcopyrite (0.27%), gersdorffite (0.26%), pyrrhotite (0.08%), millerite (0.03%), <0.01% arsenopyrite, cobaltite, galena, and tetrahedrite, and <0.001% tetradymite. Sulfide mineral associations and exposure were not included for this sample because most particles have been liberated due to pulverization. The image below shows pulverized sample with liberated grains of gangue and sulfides.

Mineral Weight %		
	MLA	XRD
Mineral	Wt%	Wt%
Pyrite	41.93	30
Ankerite	26.79	27
Quartz	8.53	10
Chlorite	7.55	16
Muscovite	5.91	9
Albite	4.73	5
Amphibole	1.17	
Kspar	0.69	
Ilmenite	0.47	
Rutile	0.33	2
Siderite	0.31	
Chalcopyrite	0.27	<1
Gersdorffite	0.26	
Calcite	0.22	
Apatite	0.17	
Tourmaline	0.16	
Paragonite	0.13	
Biotite	0.12	
Pyrrhotite	0.08	
Epidote	0.04	
Monazite	0.04	
Millerite	0.03	
Chromite	0.02	
Iron	0.02	
Arsenopyrite	<0.01	
Cobaltite	<0.01	
Galena	<0.01	
Magnetite	<0.01	
Sphalerite	<0.01	
Sphene	<0.01	
Tetrahedrite	<0.01	
FeClay	<0.001	
Olivine	<0.001	
Pyrophyllite	<0.001	
Tetradymite	<0.001	
Xenotime	<0.001	

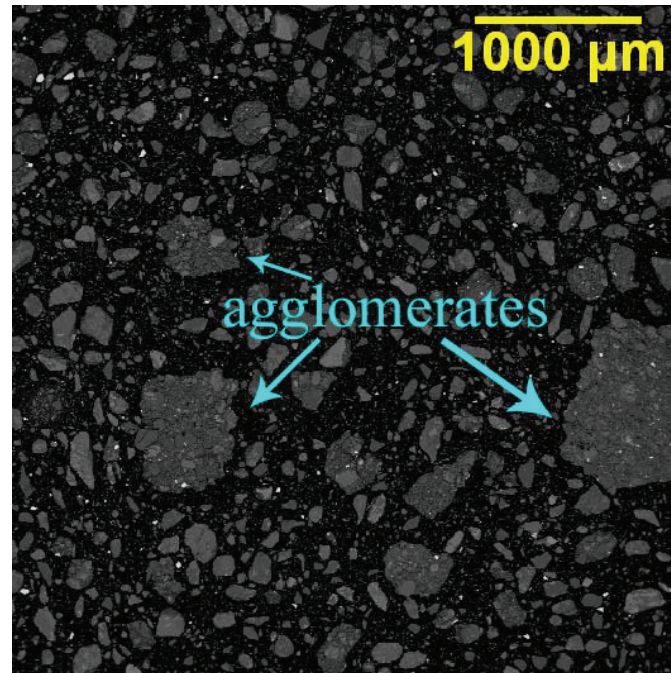


BSE image of pulverized sample. Bright gray particles are sulfides and darker gray particles are gangue.

NW MT SS 0 20100609 (HC-59) - Predominately composed of ankerite and quartz with lesser amounts of muscovite/sericite, chlorite, albite, calcite, siderite, and rutile. MLA detected minor amounts of pyrite (1.93%) and trace amounts of chalcopyrite (0.02%), gersdorffite (0.02%), pyrrhotite (0.02%), <0.01% cobaltite, and <0.001% millerite, arsenopyrite, and sphalerite. Sulfide mineral associations and exposure were not included for this sample because most particles have been liberated due to pulverization. The image below shows pulverized sample with liberated grains of gangue and sulfides.

Mineral Weight %

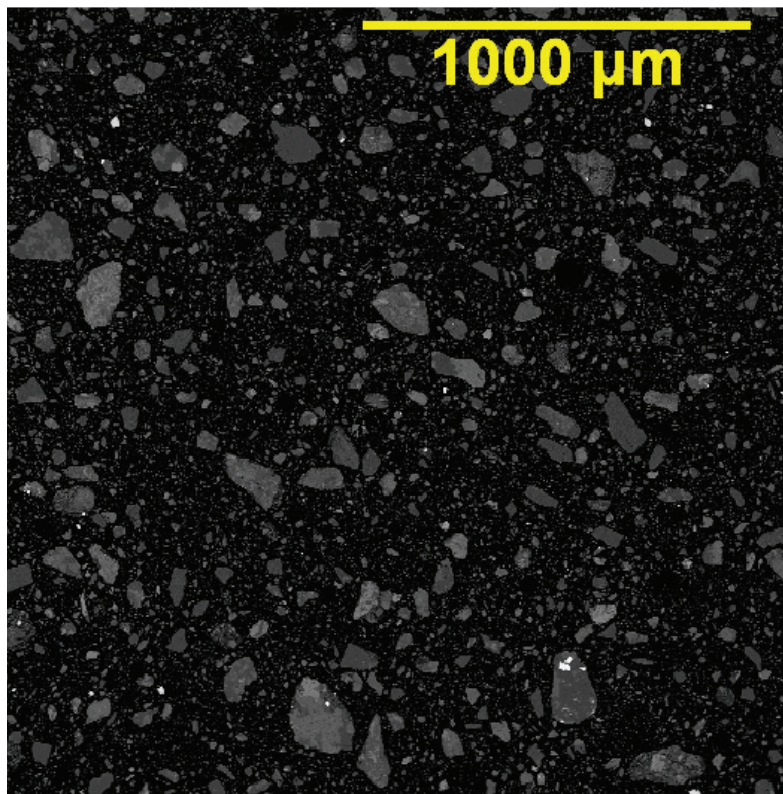
Mineral	MLA	XRD
	Wt%	Wt%
Ankerite	31.86	33
Quartz	25.02	28
Albite	18.24	8
Muscovite	8.09	13
Chlorite	7.83	13
Pyrite	1.93	1
Siderite	1.53	1
Amphibole	0.94	
Epidote	0.92	
Calcite	0.78	2
Biotite	0.56	
Paragonite	0.53	
Kspar	0.50	
Ilmenite	0.37	
Rutile	0.24	1
Apatite	0.18	
Chromite	0.06	
Chalcopyrite	0.02	
Gersdorffite	0.02	
Pyrrhotite	0.02	
Sphene	0.02	
Iron	0.01	
Magnetite	0.01	
Cobaltite	<0.01	
FeClay	<0.01	
Monazite	<0.01	
Olivine	<0.01	
Zircon	<0.01	
Arsenopyrite	<0.001	
Millerite	<0.001	
Pyrophyllite	<0.001	
Scheelite	<0.001	
Sphalerite	<0.001	
Xenotime	<0.001	



BSE image of pulverized sample. Bright gray particles are sulfides and darker gray particles are gangue. Agglomerates (pointed out) form due to preparation of fine-grained sample.

NW BFT Solids (HC-56) - Predominately composed of ankerite, quartz, and muscovite/sericite. Lesser amounts of chlorite, calcite, siderite, albite, and rutile were also detected. MLA detected trace amounts of pyrite (0.35%), <0.01% pyrrhotite, and <0.001% cobaltite and millerite. Sulfide mineral associations and exposure were not included for this sample because most particles have been liberated due to pulverization. The image below shows pulverized sample with liberated grains of gangue and sulfides.

Mineral Weight %		
	MLA	XRD
Mineral	Wt%	Wt%
Ankerite	35.58	38
Quartz	25.09	26
Muscovite	14.49	13
Chlorite	10.08	9
Albite	7.32	9
Siderite	1.24	2
Biotite	1.05	
Calcite	1.03	2
Paragonite	0.61	
Kspar	0.56	
Epidote	0.54	
Amphibole	0.45	
Ilmenite	0.45	
Pyrite	0.35	
Apatite	0.30	
Rutile	0.27	1
Tourmaline	0.23	
Chromite	0.11	
Titanomagnetite	0.09	
Hematite	0.07	
Iron	0.02	
Sphene	0.02	
Gersdorffite	0.01	
FeClay	<0.01	
Monazite	<0.01	
Olivine	<0.01	
Pyrophyllite	<0.01	
Pyrrhotite	<0.01	
Zircon	<0.01	
Cobaltite	<0.001	
Millerite	<0.001	
Scheelite	<0.001	
Xenotime	<0.001	



Low magnification BSE image of pulverized sample. Bright gray particles are sulfides and darker gray particles are gangue.

TABLE V
Mineral Key

MINERAL	FORMULA
Albite, Andesine (PLAG)	$\text{NaAlSi}_3\text{O}_8/(\text{Ca}, \text{Na})(\text{Al}, \text{Si})_4\text{O}_8$
Alstonite	$\text{BaCa}(\text{CO}_3)_2$
Amphibole (AMP)	$\text{Ca}_2(\text{Mg}, \text{Fe}, \text{Al})_5(\text{Al}, \text{Si})_8\text{O}_{22}(\text{OH})_2$
Anhydrite	CaSO_4
Ankerite (ANK)	$\text{Ca}(\text{Fe}, \text{Mg})(\text{CO}_3)_2$
Apatite	$\text{Ca}_5(\text{PO}_4)_3(\text{OH})$
Arsenopyrite	FeAsS
Barite	BaSO_4
Biotite	$\text{K}(\text{Mg}, \text{Fe})_3(\text{Si}_3\text{Al})\text{O}_{10}(\text{OH})_2$
Calcite (CAL)	CaCO_3
Chalcopyrite (CCP)	CuFeS_2
Chlorite (CHL)	$(\text{Mg}, \text{Fe}, \text{Al})_6(\text{Al}, \text{Si})_4\text{O}_{10}(\text{OH})_8$
Chromite	$(\text{FeZn})\text{Cr}_2\text{O}_4$
Cobaltite	CoAsS
Diopside (PYROX)	$(\text{Ca}, \text{Na})(\text{Mg}, \text{Fe}, \text{Al}, \text{Ti})(\text{Si}, \text{Al})_2\text{O}_6$
Electrum	Au_2Ag
Enstatite	MgSiO_3
Epidote (EPI)	$\text{Ca}_2(\text{Fe}^{3+}, \text{Al})\text{Al}_2(\text{Si}_2\text{O}_7)(\text{SiO}_4)(\text{O}, \text{OH})_2$
FeClay	$\text{Na}_{0.3}\text{Fe}_2(\text{Si}, \text{Al})_4\text{O}_{10}(\text{OH})_2 \cdot \text{N}(\text{H}_2\text{O})$
Galena	PbS
Gersdorffite	$(\text{Fe}, \text{Co}, \text{Ni})\text{AsS}$
Gold	Au
Hematite	$\text{Fe}^{3+}_2\text{O}_3$
Hessite	Ag_2Te
Ilmenite	FeTiO_3
Iron	Fe
K-feldspar (KSPAR)	KAlSi_3O_8
Magnetite (MAG)	Fe_3O_4
Millerite	NiS
Monazite	$(\text{La}, \text{Ce})\text{PO}_4$
Muscovite/Sericite (MUSC/SER)	$\text{KAl}_2(\text{AlSi}_3\text{O}_{10})(\text{OH})_2$
Olivine	$(\text{Mg}, \text{Fe})_2\text{SiO}_4$
Paragonite (PG)	$\text{NaAl}_2(\text{Si}_3\text{Al})\text{O}_{10}(\text{OH})_2$
Petzite	Ag_3AuTe_2
Platinum	Pt
Pyrite (PY)	FeS_2
Pyrophyllite (PYRO)	$\text{AlSi}_2\text{O}_5(\text{OH})$
Pyrrhotite	$\text{Fe}_{(1-x)}\text{S}$
Quartz (QTZ)	SiO_2
Rutile (RUT)	TiO_2
Scheelite	CaWO_4
Sepiolite (SEP)	$\text{Mg}_4\text{Si}_6\text{O}_{15}(\text{OH})_2 \cdot 6(\text{H}_2\text{O})$
Siderite (SID)	FeCO_3
Sphalerite	ZnS
Sphene (TIT)	CaTiSiO_5
Stibnite	Sb_2S_3
Tetradymite	$\text{Bi}_2\text{Te}_2\text{S}$
Tetrahedrite	Cu_3SbS_3
Titanomagnetite	$\text{Fe}_{3-x}\text{Ti}_x\text{O}_4$
Tourmaline (TL)	$(\text{Ca}, \text{Na})(\text{Mg}, \text{Fe}^{2+})_3\text{Al}_5\text{Mg}(\text{BO}_3)_3\text{Si}_6\text{O}_{18}(\text{OH}, \text{F})_4$
Xenotime	YPO_4
Zircon	ZrSiO_4

Mineral abbreviations are from XRD Table I.



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Memorandum

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FROM: D. Lopez/Inverness

MI 207561, 209144, 210052,
210117, 210172, 210173

DATE: May 9, 2011

COPY: S. Acar/Inverness
L. Barazzuol/SRK
D. Brosnahan/Inverness
D. Doerr/Inverness
K. Sexsmith/SRK

SUBJECT: SEM/EDS Examinations to Determine Chemical Compositions of Carbonates in Ore and Waste Composites from Various Sites in Hope Bay undergoing Humidity Cell Testing

Forty-three ore and waste composites undergoing humidity cell testing were analyzed using a scanning electron microscope (SEM) with energy dispersive X-ray spectrometers (EDS) to characterize carbonate composition when solid-solutions occur. A previous report¹ on sulfide characterization includes semiquantitative mineralogy by XRD (X-ray diffraction) and MLA (Mineral Liberation Analyzer) as well as chemical analyses for the samples in this suite.

Particles of ferroan dolomite and Mg-rich siderite were manually located by SEM where FeO, CaO, and MgO contents were quantified from energy dispersive X-ray spectra. These weight percent averages were turned into mole % yielding a formula for each mineral in a sample. Carbonates were only characterized if they were detected by XRD (table shown in previous report mentioned above), since these are the values which should be regarded when comparing quantities of major and minor phases with MLA values.

Samples were manually scanned by SEM to locate carbonates for spot analyses. Standardless semiquantitative software was used to calculate oxide composition. The table below shows weight percent averages given in oxides FeO, CaO, and MgO together with a calculated formula for each carbonate phase. Averages are based on compositions from ten particles of each phase manually located and quantified; these values were then normalized with CO₂ values.

¹ "Semiquantitative Mineralogy by XRD and Sulfide Characterization by MLA for Forty-three Ore and Waste Composites from Various Sites in Hope Bay undergoing Humidity Cell Testing", D. Lopez. NMS Memo. Feb 10, 2011.

**Chemical Compositions* of Carbonates from
HCT Composites from Hope Bay**

	Ferroan Dolomite							Mg-rich Siderite					
Sample ID	MgO	CaO	FeO	CO ₂		Formula		MgO	CaO	FeO	CO ₂		Formula
08PMD650, 33-36.4m	21.7	28.3	4.7	45.2		Ca(Mg _{0.89} Fe _{0.11})CO ₃		-	-	-	-		-
07PMD552, 134-144.5m	24.1	27.9	2.8	45.2		Ca(Mg _{0.80} Fe _{0.20})CO ₃		-	-	-	-		-
08PSD142, 245.5-254.5m	-	-	-	-		-		-	-	-	-		-
06PMD470, 217.03-218.7m	20	25.7	9.1	45.2		Ca(Mg _{0.80} Fe _{0.20})CO ₃		-	-	-	-		-
07PMD542, 104.15-105.29m	15.3	25.2	14.4	45.2		Ca(Mg _{0.66} Fe _{0.34})CO ₃		-	-	-	-		-
06PMD470, 371.05-376.28m	-	-	-	-		-		-	-	-	-		-
07PMD542, 73.28-77m	19.5	27.4	7.8	45.2		Ca(Mg _{0.82} Fe _{0.18})CO ₃		-	-	-	-		-
06PMD484, 224.5-226.5m	22.1	26.6	6.1	45.2		Ca(Mg _{0.87} Fe _{0.13})CO ₃		-	-	-	-		-
07PMD552, 58.5-72m	17	25.7	12.1	45.2		Ca(Mg _{0.72} Fe _{0.28})CO ₃		-	-	-	-		-
07PMD522, 27-38m	20.5	25.7	8.6	45.2		Ca(Mg _{0.81} Fe _{0.19})CO ₃		-	-	-	-		-
07PMD522, 126-136.5m	15.5	25.8	13.5	45.2		Ca(Mg _{0.67} Fe _{0.33})CO ₃		-	-	-	-		-
06PMD470, 85-88m	15.5	25.5	13.8	45.2		Ca(Mg _{0.67} Fe _{0.33})CO ₃		-	-	-	-		-
08PMD657A, 101.5-111.5m	16.3	26	12.1	45.2		Ca(Mg _{0.71} Fe _{0.29})CO ₃		17.2	0.4	40.8	41.6		(Fe _{0.57} Mg _{0.43})CO ₃
08PMD657A, 90.5-91m	15.7	25.8	13	45.2		Ca(Mg _{0.68} Fe _{0.32})CO ₃		-	-	-	-		-
07SBD374, 53.4-64.5m	15.7	25.5	13.6	45.2		Ca(Mg _{0.67} Fe _{0.33})CO ₃		16.6	0.4	41.5	41.6		(Fe _{0.58} Mg _{0.42})CO ₃
08SBD380, 7.2-14m	16.1	25.7	13	45.2		Ca(Mg _{0.69} Fe _{0.31})CO ₃		-	-	-	-		-
08SBD380, 23-33.5m	14.7	26	14.2	45.2		Ca(Mg _{0.65} Fe _{0.35})CO ₃		-	-	-	-		-
08SBD382, 7.43-12.82m	17.6	26.2	11.1	45.2		Ca(Mg _{0.74} Fe _{0.26})CO ₃		-	-	-	-		-
08SBD382, 267.5-276.52m	14.8	25.4	14.6	45.2		Ca(Mg _{0.64} Fe _{0.36})CO ₃		-	-	-	-		-
08TDD631, 33.5-37.3m	12	25.4	17.4	45.2		Ca(Mg _{0.55} Fe _{0.45})CO ₃		-	-	-	-		-
94NOD124, 259-263.5m	13.9	25.7	15.2	45.2		Ca(Mg _{0.62} Fe _{0.38})CO ₃		-	-	-	-		-
94NOD124, 277.5-280m	12.1	25.2	17.5	45.2		Ca(Mg _{0.55} Fe _{0.45})CO ₃		11.7	0.5	46.2	41.6		(Fe _{0.69} Mg _{0.31})CO ₃

Cont'd Table of Carbonate Composition

	Ferroan Dolomite						Mg-rich Siderite					
Sample ID	MgO	CaO	FeO	CO ₂		Formula	MgO	CaO	FeO	CO ₂		Formula
04PMD272, 105-110m	15.7	25.5	13.5	45.2		Ca(Mg _{0.68} Fe _{0.32})CO ₃	-	-	-	-		-
05PMD310, 6-31m	23.2	28.1	3.5	45.2		Ca(Mg _{0.92} Fe _{0.08})CO ₃	-	-	-	-		-
05PMD293, 8.89-34m	18.1	26	10.7	45.2		Ca(Mg _{0.75} Fe _{0.25})CO ₃	24.6	0.5	33.4	41.6		(Fe _{0.43} Mg _{0.57})CO ₃
02TDD506, 39-64m	11.9	26.9	16	45.2		Ca(Mg _{0.57} Fe _{0.43})CO ₃	-	-	-	-		-
02TDD545, 6.36-32m	10	25.9	18.9	45.2		Ca(Mg _{0.49} Fe _{0.51})CO ₃	9.2	0.5	48.6	41.6		(Fe _{0.75} Mg _{0.25})CO ₃
02TDD545, 82-100.73m	13.9	25.6	15.2	45.2		Ca(Mg _{0.62} Fe _{0.38})CO ₃	-	-	-	-		-
TDD380, 245-254.5m	12.2	25.6	17	45.2		Ca(Mg _{0.56} Fe _{0.44})CO ₃	9.3	0.4	48.7	41.6		(Fe _{0.75} Mg _{0.25})CO ₃
TDD380, 272-294m	9.9	25.8	19.1	45.2		Ca(Mg _{0.48} Fe _{0.52})CO ₃	-	-	-	-		-
TDD374, 61-67.6m	-	-	-	-		-	-	-	-	-		-
TDD374, 11.63-36m	-	-	-	-		-	-	-	-	-		-
TDD370, 253.21-255.12m	9	25	20.7	45.2		Ca(Mg _{0.44} Fe _{0.56})CO ₃	7.9	0.5	49.6	41.6		(Fe _{0.78} Mg _{0.22})CO ₃
TDD387, 151.2-153.5m	9.4	25.2	20.2	45.2		Ca(Mg _{0.45} Fe _{0.55})CO ₃	8.4	0.5	49.5	41.6		(Fe _{0.77} Mg _{0.23})CO ₃
97TDD131, 169.13-171.61m	15	26.5	13.3	45.2		Ca(Mg _{0.67} Fe _{0.33})CO ₃	19	0.4	39	41.6		(Fe _{0.53} Mg _{0.47})CO ₃
TDD392, 214.58-216.68m	12.4	25.5	16.9	45.2		Ca(Mg _{0.57} Fe _{0.43})CO ₃	-	-	-	-		-
TDD368, 175-178m	14.5	25.7	14.6	45.2		Ca(Mg _{0.64} Fe _{0.36})CO ₃	-	-	-	-		-
TDD363, 153.85-155.96m	13.9	25.9	15.1	45.2		Ca(Mg _{0.62} Fe _{0.38})CO ₃	-	-	-	-		-
94NOD128, 20.7-30m	18.5	26.1	10.1	45.2		Ca(Mg _{0.77} Fe _{0.23})CO ₃	-	-	-	-		-
HB DCO G Float Tails M.C.	11.8	25.4	17.6	45.2		Ca(Mg _{0.55} Fe _{0.45})CO ₃	9	0.7	48.7	41.6		(Fe _{0.75} Mg _{0.25})CO ₃
NW CNDT SS 20100602	17.5	25.1	11.9	45.2		Ca(Mg _{0.72} Fe _{0.28})CO ₃	-	-	-	-		-
NW MT SS 0 20100609	17.2	25.4	11.4	45.2		Ca(Mg _{0.73} Fe _{0.27})CO ₃	18.2	0.6	39.6	41.6		(Fe _{0.55} Mg _{0.45})CO ₃
NW BFT Solids HC-56	18.3	25.2	11.3	45.2		Ca(Mg _{0.74} Fe _{0.26})CO ₃	19.7	0.6	38.1	41.6		(Fe _{0.52} Mg _{0.48})CO ₃

*Only samples where XRD detected carbonates were considered for examination (see previous report mentioned for semiquantitative mineralogy values by XRD).

Mineralogy for HC-13, HC-14 and HC-16



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Memorandum

TO: K. Murphey/Inverness File K0011453, K0011463, K0011473
MI 206595, 206596, 207561,
FROM: D. Lopez/Inverness 207535, 207571, 207620,
207630, 207874, 207875,
DATE: November 18, 2009 207877, 208158
COPY: D. Brosnahan/Inverness
K.M. Le Vier/Inverness
M. McComb/Inverness
SUBJECT: Semiquantitative Mineralogy of Thirteen Samples from Boston, Doris, and Madrid Hope Bay

Thirteen samples from Hope Bay were submitted by K. Murphey for identification of their mineral contents by XRD. The results of the analyses are shown in Table I, where quantities were determined by Rietveld refinement and whole pattern fitting.

XRD analyses show that samples from Hope Bay are carbonate-rich containing calcite (0-3%), magnesite (0-10%), siderite (0-4%) and predominately ankerite/dolomite (19-46%). The residue samples (5) are also rich in pyrite containing 15-31%; Doris and Boston Mixed Dry samples contain minor amounts of pyrite (2-3%). Other mineral constituents are paragonite (0-6%), plagioclase (0-21%), muscovite (3-13%), chlorite (3-15%), and varying amounts of quartz (11-61%). Minor amounts of tourmaline and diaspore were only detected in a few samples.

For the ankerite column in Table I, ankerite and dolomite are combined because XRD analyses showed no discernible difference (shift in peaks) between ankerite and dolomite. Ankerite/dolomite could be referred to as ferroan dolomite, and magnesite and siderite can be referred to as siderite/Mg-rich siderite based on MLA/SEM examinations^{1,2} of these samples.

¹ "MLA/SEM Examinations to Determine Chemical Compositions of Carbonates and Trace Modal Mineralogy from Madrid, Boston, and Doris Samples, Hope Bay", D. Lopez. NMS Memo. October 13, 2009.

² "MLA/SEM Examinations to Determine Chemical Compositions of Carbonates and Modal Mineralogy of Two CND Residue Samples from Boston and Doris, Hope Bay", D. Lopez. NMS Memo. November 9, 2009.

TABLE I
Semiquantitative XRD Data (Wt.%) of Thirteen Samples from Hope Bay

Sample ID	ANK	CAL	CHL	DIA	MAGN	MUSC	PG	PLAG	PY	QTZ	RUT	SID	TL
B-BFT-1, Dry	35		4		4	8	6			40	1	1	
NW-BFT-1, Dry	38	2	9			13		9		26	1	2	
DC-BFT	21		3			7	4			61	2	2	tr
NE-BFT-dry	38		7		10	8		17		19	1		
Doris Mixed Dry	19		3			6	4		2	61	1	2	1
Boston Mixed Dry	31		6		8	5	7		3	36	1		3
Suluk Dry	46	1	15		2	9		5		21	1		
Doris CND Residue	18	2	2	2		6	4		31	30	1	4	
Boston CND Residue*	31		6	1		12	6		18	22	2	1	
Suluk, Naartok E, W 40,30,30 %**	39	tr	10			9		11		26	2	3	
Naartok West, Residue 2**	38	3	10			3		7	15	19	2	3	
Naartok East, Residue 2**	30	tr	5			3		21	26	11	2	2	
Suluk, Residue 2**	32	tr	10			3		10	29	13	2		

tr: Trace amount

* - XRD data provided by S. Sutley/Consultant³

** - XRD data provided by A. Melberg/Inverness⁴

Mineral Key

Mineral	Formula	Mineral	Formula
Ankerite/Dolomite (ANK)	Ca(Fe,Mg)(CO ₃) ₂	Plagioclase (PLAG)	(Ca,Na)(Al,Si)AlSi ₂ O ₈
Calcite (CAL)	CaCO ₃	Pyrite (PY)	FeS ₂
Chlorite (CHL)	(Mg,Fe,Al) ₆ (Al,Si) ₄ O ₁₀ (OH) ₈	Quartz (QTZ)	SiO ₂
Diaspore (DIA)	AlO(OH)	Rutile (RUT)	TiO ₂
Magnesite (MAGN)	MgCO ₃	Siderite (SID)	FeCO ₃
Muscovite/Sericite (MUSC)	KAl ₂ (AlSi ₃ O ₁₀)(OH) ₂	Tourmaline (TL)	Na(Fe,Mg) ₃ Al ₆ Si ₆ O ₁₈ (BO ₃) ₃ (OH) ₄
Paragonite (PG)	NaAl ₃ Si ₃ O ₁₀ (OH) ₂		

³ "Semiquantitative Mineralogy of One Sample from Hope Bay (Boston)", S. Sutley. NMS Memo. June 30, 2009.

⁴ "Semiquantitative Mineralogy of a Suluk, Naartok East, and Naartok West Blend Sample from Madrid, Hope Bay", A. Melberg. NMS Memo. July 29, 2009.
"Semiquantitative Mineralogy of Three Bottle Roll Residue Samples from Madrid, Hope Bay", A. Melberg. NMS Memo. July 29, 2009.

Appendix E – Acid-Base Accounting Data

Acid-Base Accounting Data - Madrid North, Madrid South & Boston Tailings

Mine	Tailings Type	Ore deposit	Sample ID	Paste pH	Total S %S	Sulphate S %S	Sulphide %S	AP kg CaCO3/t	Total carbon %C	Organic C %C	TIC %C	TIC %CO2	Fizz test	TIC kgCaCO3/t	TIC kgCaCO3/t	Modified NP kgCaCO3/t	NP/AP	TIC/AP
Madrid North	Flotation	Naartok West	HC-56	8.5	0.08	<0.01	0.08	2.5	--	--	--	16.92	Strong	385	385	319	128	154
		Naartok East		8.7	0.11	0.01	0.1	3.1	--	--	--	19.3	Strong	439	439	358	114	140
		Suluk		8.7	0.1	0.01	0.09	2.8	6.01	--	--	22.67	Strong	515	515	399	142	183
		Composite ⁴	HC-14	9.0	0.09	<0.01	0.09	2.8	5.67	--	--	19.15	Strong	435	435	358	127	155
	Detoxified tailings	Naartok West	HC-58	7.8	18.75	0.07	18.68	584	4.32	--	--	13.45	Strong	306	306	247	0.42	0.52
	Mixed ¹	Naartok West	HC-59	8.5	0.98	<0.01	0.98	31	4.84	--	--	18.63	Strong	423	423	307	10	14
Madrid South	Flotation	Patch 14	172195	9.1	0.05	<0.01	0.05	1.6	--	--	--	17.21	Moderate	391	391	278	178	250
			172198	9.0	<0.02	<0.01	0.02	0.63	--	--	--	11.56	Moderate	263	263	185	296	420
			172199	8.8	<0.02	<0.01	0.02	0.63	--	--	--	2.63	Moderate	60	60	40	64	96
			172200	9.1	<0.02	<0.01	0.02	0.63	--	--	--	6.02	Moderate	137	137	101	162	219
			P14 BFT Solids A	9.7	0.03	0.03	0.02	0.63	--	--	--	11.67	Moderate	265	265	184	294	424
	Detoxified tailings ²	Patch 14	179048	8.3	15.44	0.03	15.41	482	--	--	--	10.24	Moderate	233	233	155	0.32	0.48
			179049	8.3	18.56	0.02	18.54	579	--	--	--	8.33	Moderate	189	189	133	0.23	0.33
			179050	8.8	8.47	0.01	8.46	264	--	--	--	5.29	Moderate	120	120	93	0.35	0.45
Boston	Flotation		HC-13	8.5	0.05	<0.01	0.05	1.6	--	--	--	15.76	Strong	358	358	279	178	229
	Detoxified tailings		HC-2	7.8	12.86	0.03	12.83	401	0.21	0.12	0.09	--	Strong	7.5	7.5a	210	0.52	0.019
	Mixed ³		HC-16	8.3	2.1	0.01	2.09	65	4.38	--	--	16.73	Strong	380	380	267	4.1	5.8

Notes:
¹95% flotation; 5% detoxified tailings
²Prior to detoxification
³83% flotation; 17% detoxified tailings
⁴Composite of 40% Suluk, 30% Naartok East, 30% Naartok
^aDetermined as the difference between total carbon and organic carbon. See Section 3.3 for details.

Appendix F – Trace Element Data

Trace Element Data - Madrid North, Madrid South & Boston Tailings

Mine	Tailings Type	Ore deposit	Sample ID	Ag ppm	Al %	As ppm	Au ppb	B ppm	Ba ppm	Bi ppm	Ca %	Cd ppm	Co ppm	Cr ppm	Cu ppm	Fe %	Ga ppm	Hg ppb
Madrid North	Flotation	Naartok West	HC-56	0.1	1	340	78	20	19	0.1	7.5	0.1	34	190	38	5.9	3	10
		Naartok East		0.1	0.74	330	84	20	9	0.1	7.8	0.1	34	140	29	5.8	2	10
		Suluk		0.1	1.2	260	140	20	11	0.1	9.4	0.1	35	220	29	6.1	4	10
		Composite ⁴	HC-14	0.1	1.1	310	720	20	17	0.1	8.5	0.1	34	180	33	6.1	3	10
	Detoxified tailings	Naartok West	HC-58	0.9	0.75	3700	55	20	14	0.9	5.8	0.2	430	170	1600	20	3	100
	Mixed ¹	Naartok West	HC-59	0.1	1	520	160	20	20	0.1	7.5	0.1	57	200	110	6.5	3	10
Madrid South	Flotation	Patch 14	172195	0.1	0.14	37	76	20	5	0.2	6.3	0.5	10	70	18	4.2	1	20
			172198	0.1	0.08	21	100	20	3	0.1	4.5	0.1	5.5	86	13	2.8	1	20
			172199	1.2	0.04	8.6	3000	20	3	0.1	1.2	0.1	1.7	78	15	0.8	1	10
			172200	0.1	0.12	5.8	400	20	7	0.1	2.5	0.1	2.5	84	10	1.5	1	10
			P14 BFT Solids ABA Maxxam	0.2	0.42	14	200	20	19	0.1	4.4	0.1	5.6	43	15	3.2	1	0
	Detoxified tailings ²	Patch 14	179048	1	0.15	3200	3400	20	9	4.9	4.2	1.6	250	140	970	18	1	0
			179049	2.3	0.21	3300	6300	20	12	2.3	3.6	0.8	280	160	790	19	1	0
			179050	1.6	0.29	1800	2100	20	23	1.4	2.5	1	170	190	870	9.8	1	0
Boston	Flotation		HC-13	0.1	0.31	86	210	20	10	0.1	6.5	0.2	13	110	31	5	1	10
	Detoxified tailings		HC-2	1.3	0.33	4200	530	20	16	0.4	5.8	1.2	240	160	580	17	1	40
	Mixed ²		HC-16	0.3	0.32	690	260	20	10	0.1	6.2	0.3	50	150	130	6.8	1	10
Ave. Crustal Abudance for Basalt (Price 1997)				0.11	7.8	2	4	5	330	0.007	7.6	0.22	48	170	87	8.7	17	90

Notes:
¹95% flotation; 5% detoxified tailings
²Prior to detoxification
³83% flotation; 17% detoxified tailings
⁴Composite of 40% Suluk, 30% Naartok East, 30% Naartok
Values in red are equal to the laboratory detection limit. Detection limit shown.
Bolded values are ten times greater than Price (1997)

Trace Element Data - Madrid North, Madrid South & Boston Tailings

Mine	Tailings Type	Ore deposit	Sample ID	Hg_CV ug/g	K %	La ppm	Mg %	Mn ppm	Mo ppm	Na %	Ni ppm	P %	Pb ppm	S %	Sb ppm	Sc ppm	Se ppm	Sr ppm
Madrid North	Flotation	Naartok West	HC-56	0	0.08	3	3.5	1600	0.9	0.012	270	0.046	1.8	0.06	0.7	12	0.5	140
		Naartok East		0	0.04	3	4.3	1800	0.9	0.01	290	0.036	3.6	0.09	0.5	13	0.5	170
		Suluk		0	0.03	3	4.3	1900	1.2	0.01	320	0.058	2.4	0.08	0.3	12	0.5	140
		Composite ⁴	HC-14	0	0.07	3	4	1700	0.9	0.014	300	0.045	2.6	0.08	0.3	13	0.5	150
	Detoxified tailings	Naartok West	HC-58	0	0.04	2	2.6	1200	11	0.044	1800	0.04	30	10	4.2	7.3	9	100
	Mixed ¹	Naartok West	HC-59	0	0.1	2	3.6	1600	1.6	0.019	350	0.047	3.3	0.96	0.8	12	0.6	130
Madrid South	Flotation	Patch 14	172195	0	0.02	1	2.3	1200	4.1	0.024	39	0.01	1.7	0.05	0.1	10	0.5	57
			172198	0	0.02	1	1.6	700	4.8	0.014	35	0.006	1.5	0.05	0.1	7	0.5	47
			172199	0	0.01	1	0.37	160	5.1	0.003	19	0.005	13	0.05	0.5	0.9	0.5	19
			172200	0	0.03	2	0.88	340	6.4	0.019	23	0.023	1.2	0.05	0.1	2.1	0.5	35
			P14 BFT Solids ABA Maxxam	0	0.08	2	1.7	720	1.2	0.086	22	0.021	1.3	0.05	0.1	5.6	0.5	66
	Detoxified tailings ²	Patch 14	179048	0	0.03	1	1.5	860	6.8	0.035	510	0.009	47	0	1.4	7.1	10	47
			179049	0	0.04	1	1.2	620	7.1	0.05	610	0.007	42	0	1	6.4	14	49
			179050	0	0.07	2	0.79	380	12	0.052	350	0.02	440	8.4	9.4	2.4	6.7	45
Boston	Flotation		HC-13	0	0.02	1	3.1	1600	2.6	0.01	62	0.021	2.2	0.05	0.4	8.9	0.5	49
	Detoxified tailings		HC-2	0	0.03	1	2.4	1300	7.9	0.042	1000	0.018	56	0	4.8	7.8	9.6	49
	Mixed ²		HC-16	0	0.02	1	3	1500	6	0.011	240	0.022	9.5	2.2	1.2	8.6	1.7	46
Ave. Crustal Abudance for Basalt (Price 1997)				0	0.83	15	4.6	1500	1.5	1.8	130	0.11	6	0.03	0.2	30	0.05	470

Notes:
¹95% flotation; 5% detoxified tailings
²Prior to detoxification
³83% flotation; 17% detoxified tailings
⁴Composite of 40% Suluk, 30% Naartok East, 30% Naartok
Values in red are equal to the laboratory detection limit. Detection limit shown.
Bolded values are ten times greater than Price (1997)

Trace Element Data - Madrid North, Madrid South & Boston Tailings

Mine	Tailings Type	Ore deposit	Sample ID	Te ppm	Th ppm	Ti %	Tl ppm	U ppm	V ppm	W ppm	Zn ppm
Madrid North	Flotation	Naartok West	HC-56	0	0.3	0.021	0.1	0.1	54	3.9	39
		Naartok East		0	0.2	0.001	0.1	0.1	50	0.3	26
		Suluk		0	0.3	0.002	0.1	0.1	73	4.1	38
		Composite ⁴	HC-14	0	0.3	0.006	0.1	0.1	65	2.5	36
	Detoxified tailings	Naartok West	HC-58	0	0.5	0.002	0.3	0.1	46	3	78
	Mixed ¹	Naartok West	HC-59	0	0.3	0.019	0.1	0.1	56	4.4	39
Madrid South	Flotation	Patch 14	172195	0.2	0.1	0.001	0.1	0.1	22	0.5	41
			172198	0.2	0.1	0.001	0.1	0.1	12	0.8	26
			172199	1.1	0.1	0.001	0.1	0.1	4	77	17
			172200	0.2	0.3	0.001	0.1	0.1	6	52	20
			P14 BFT Solids ABA Maxxam	0.2	0.4	0.001	0.1	0.1	17	38	40
	Detoxified tailings ²	Patch 14	179048	5.2	0.1	0.001	0.1	0.2	20	3.3	91
			179049	7.8	0.1	0.001	0.1	0.1	16	1.9	63
			179050	20	0.6	0.001	0.1	0.2	12	99	260
Boston	Flotation		HC-13	0	0.1	0.001	0.1	0.1	20	76	68
	Detoxified tailings		HC-2	0	0.1	0.001	0.1	0.1	23	42	260
	Mixed ²		HC-16	0	0.1	0.001	0.1	0.1	20	73	99
Ave. Crustal Abudance for Basalt (Price 1997)				0	4	1.4	0.21	1	250	0.7	110

Notes:
¹95% flotation; 5% detoxified tailings
²Prior to detoxification
³83% flotation; 17% detoxified tailings
⁴Composite of 40% Suluk, 30% Naartok East, 30% Naartok
Values in red are equal to the laboratory detection limit. Detection limit shown.
Bolded values are ten times greater than Price (1997)

Appendix G – Kinetic Data, Humidity Cell Tests

Appendix G: Kinetic Data, Humidity Cell Tests

Table G.1: Summary of Static and Kinetic Test Results for Madrid & Boston

Humidity Cell #	Deposit	Tailings Type	Static Test Results						Kinetic Test Results										
			Paste pH	Sulphide Sulphur (%S)	NP*	TIC	NP/AP	TIC/AP	pH		Initial Rate			Overall Rate			Stable Rate		
					(kg CaCO3/Tonne)	SO4					As	Cu	SO4	As	Cu	SO4	As	Cu	
									min	max									mg/kg/week
HC-56	Naartok West	Flotation	8.45	0.08	319	385	127.5	153.8	8.0	8.4	381	0.35	0.0032	11	0.11	0.00039	2.2	0.048	0.0004
HC-58	Naartok West	CND Residue	7.83	18.68	247	306	0.4	0.5	7.2	8.0	1551	0.065	0.0048	420	0.0041	0.00082	381	0.0040	0.0011
HC-59	Naartok West	Mixed	8.52	0.98	307	423	10.0	13.8	7.9	8.5	146	0.36	0.0018	74	0.025	0.00035	85	0.0051	0.0003
HC-14	Madrid Composite	Flotation	9.02	0.09	358	435	127.4	154.7	7.9	8.5	70.6	0.14	0.0010	9.3	0.044	0.00036	1.9	0.015	0.0000
HC-13	Boston	Flotation	8.46	0.05	279	358	178.4	229.2	7.9	8.4	118	0.017	0.0014	4.4	0.0016	0.00024	0.9	0.0012	0.0002
HC-2	Boston	CND Residue	7.77	12.83	210	8	0.5	0.0	7.1	7.8	399	0.18	0.0045	200	0.0029	0.00084	160	0.0017	0.0003
HC-16	Boston	Mixed	8.33	2.09	267	380	4.1	5.8	7.7	8.4	338	0.067	0.0074	42	0.0067	0.00066	12	0.0031	0.0003

*Modified NP

Appendix G: Kinetic Data, Humidity Cell Tests

Table G.2: Summary of Stable Rates for Madrid & Boston Humidity Cell Tests

Humidity Cell #	Deposit	Tailings Type	SO4	Al	Sb	As	Ba	Cd	Ca	Cr	Co	Cu	Fe	Pb	Mg	Mn	Hg	Mo	Ni	Se	Ag	Tl	Th	Ti	V	Zn
			mg/kg/week	mg/kg/week	mg/kg/week	mg/kg/week	mg/kg/week	mg/kg/week	mg/kg/week	mg/kg/week	mg/kg/week	mg/kg/week	mg/kg/week	mg/kg/week	mg/kg/week	mg/kg/week	mg/kg/week	mg/kg/week	mg/kg/week	mg/kg/week	mg/kg/week	mg/kg/week	mg/kg/week	mg/kg/week	mg/kg/week	mg/kg/week
HC-56	Naartok West	Flotation	2.2	0.018	0.00062	0.048	0.035	0.0000035	7.1	0.000119	0.000048	0.00041	0.0040	0.000011	6.2	0.00072	0.000001	0.00049	0.0000005	0.000081	0.000003	0.000006	0.000002	0.00024	0.00020	0.00070
HC-58	Naartok West	CND Residue	381	0.014	0.00014	0.0040	0.0018	0.0000085	105	0.000074	0.029	0.0011	0.0041	0.000013	29.6	0.26	0.000001	0.00059	0.11	0.0016	0.000004	0.000011	0.000004	0.00037	0.00015	0.00048
HC-59	Naartok West	Mixed	85	0.005	0.00030	0.0051	0.0070	0.0000025	12.0	0.0031	0.00070	0.00033	0.12	0.000007	29.5	0.00083	0.000001	0.0035	0.0018	0.00010	0.000002	0.000011	0.000002	0.00025	0.00010	0.00018
HC-14	Madrid Composite	Flotation	1.9	0.011	0.00024	0.015	0.00046	0.0000032	4.5	0.00023	0.000034	0.00009	0.0042	0.000006	5.2	0.0012	0.000001	0.00036	0.00039	0.000069	0.000003	0.000002	0.000002	0.00023	0.00010	0.00051
HC-13	Boston	Flotation	0.9	0.0017	0.00014	0.0012	0.00054	0.0000048	7.0	0.00023	0.000051	0.00022	0.0041	0.000020	7.0	0.0011	0.000001	0.0011	0.00029	0.00009	0.000007	0.000004	0.000023	0.00026	0.00008	0.00056
HC-2	Boston	CND Residue	160	0.0025	0.00070	0.0017	0.00085	0.0000094	64	0.000074	0.0015	0.00038	0.0041	0.000019	24.1	0.0078	0.000001	0.00016	0.015	0.00049	0.000003	0.000028	0.000003	0.00029	0.00020	0.00069
HC-16	Boston	Mixed	11.9	0.0022	0.00029	0.0031	0.00032	0.0000028	8.5	0.000051	0.00020	0.00034	0.0038	0.000008	6.8	0.0052	0.000001	0.00043	0.00068	0.00023	0.000002	0.000003	0.000002	0.00023	0.00009	0.00093

Humidity Cell #	Deposit	Tailings Type	Alkalinity	Fluoride	Chloride	Nitrate-N	Nitrite-N	Ammonia	Phophorus	Total CN	WAD CN	Free CN	SCN	CNO
			mg/kg/week	mg/kg/week	mg/kg/week	mg/kg/week	mg/kg/week	mg/kg/week	mg/kg/week	mg/kg/week	mg/kg/week	mg/kg/week	mg/kg/week	mg/kg/week
HC-56	Naartok West	Flotation	39	0.0071	0.8	0.11	0.0024	0.028	0.015	--	--	--	--	--
HC-58	Naartok West	CND Residue	26	0.029	0.57	0.015	0.0037	0.82	0.0071	0.015	0.015	0.015	0.17	0.015
HC-59	Naartok West	Mixed	60	0.0050	1.0	0.021	0.0025	0.078	0.0033	0.098	0.010	0.0099	0.052	0.010
HC-14	Madrid Composite	Flotation	29	0.0047	0.09	0.13	0.0023	0.021	0.0062	--	--	--	--	--
HC-13	Boston	Flotation	43	0.011	0.053	0.039	0.0019	0.074	0.0044	--	--	--	--	--
HC-2	Boston	CND Residue	12	0.0062	0.34	0.012	0.0029	0.13	0.0040	0.000	0.000	0.000	0.000	0.000
HC-16	Boston	Mixed	34	0.0052	0.45	0.010	0.0026	0.078	0.0040	0.010	0.010	0.010	0.052	0.010

Appendix G: Kinetic Data, Humidity Cell Tests

Table G.3: Summary of Madrid & Boston Kinetic Test Depletion Rates

Humidity Cell #	Deposit	Tailings Type	NP/AP	TIC/AP	Ca+Mg/ SO4	Stable SO4 Release Rate	Time to Depletion			NP Depletion > AP Depletion	TIC Depletion > AP Depletion	Ca+Mg/SO4 < NP/AP	Ca+Mg/SO4 < TIC/AP	Prediction	
							NP	TIC	Suphide					Neutral	Acidic
							years								
HC-56	Naartok West	Flotation	127.5	153.8	18.43	2.2	140	169	19	Yes	Yes	Yes	Yes	likely	possible
HC-58	Naartok West	CND Residue	0.4	0.5	0.97	381.5	11	14	26	No	No	No	No		
HC-59	Naartok West	Mixed	10.0	13.8	1.71	84.9	37	52	5	Yes	Yes	Yes	Yes	likely	
HC-14	Madrid Composite	Flotation	127.4	154.7	16.67	1.9	206	251	25	Yes	Yes	Yes	Yes	likely	
HC-13	Boston	Flotation	178.4	229.2	47.71	0.9	112	145	28	Yes	Yes	Yes	Yes	likely	possible
HC-2	Boston	CND Residue	0.5	0.0	1.55	160.1	12	-3	42	No	No	No	No		
HC-16	Boston	Mixed	4.1	5.8	3.97	11.9	101	145	98	Yes	Yes	Yes	Yes	likely	

*Terminated

Appendix G: Kinetic Data, Humidity Cell Tests

Naartok West
HC-56 Flotation Tailings

Concentrations																																
Sampling Date	Week No.	Input Vol. ml	Output Vol. ml	pH pH Units	EC µS/cm	ORP mV	SO4 mg/L	Acidity to pH 4.5 mg CaCO3/L	Acidity to pH 8.3 mg CaCO3/L	Alkalinity mg CaCO3	Fluoride mg/L	Chloride mg/L	Nitrate-N mg/L	Nitrite-N mg/L	Total Ammonia mgN/L	Diss.-P mgP/L	TDS mg/L	Hardness CaCO3 mg/L	Al mg/L	Sb mg/L	As mg/L	Ba mg/L	Be mg/L	Bi mg/L	B mg/L	Cs mg/L	Cd mg/L	Ca mg/L	Cr mg/L	Co mg/L	Cu mg/L	La mg/L
Detection Limits		5	5	0.01	1.0	50	1.0	1.0	1.0	1.0	0.1	0.2	0.02	0.002	0.01	0.001	10	Calculation	0.001	0.0001	0.0002	0.0002	0.0001	0.0001	0.0005	0.0001	0.00001	0.01	0.0002	0.0001	0.0001	0.0001
14-Apr-10	0	750	410	7.98	1554	175	930	--	--	58	0.3	13	0.07	0.103	0.19	0.247	1200	745.0722	0.023	0.0222	0.857	0.028	0.0001	0.001	0.225	0.0002	0.00018	153	0.012	0.0048	0.0077	0.0002
21-Apr-10	1	500	420	8.29	422	145	137	--	1	106	0.32	0.7	0.03	0.016	0.17	0.4	220	198.6092	0.032	0.0169	1.32	0.0214	0.00005	0.00003	0.3	0.0003	0.00003	38	0.0005	0.00135	0.0042	0.0002
28-Apr-10	2	500	500	8.39	261	130	47	--	--	87	0.27	0.5	0.02	0.005	0.005	0.398	130	123.6382	0.053	0.012	1.08	0.0265	0.00005	0.00003	0.3	0.0003	0.00003	23.8	0.0005	0.00076	0.0017	0.0003
5-May-10	3	500	425	8.34	273	120	40	--	--	100	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	24.8	--	--	--	--
12-May-10	4	500	490	8.38	298	130	35	--	--	123	0.22	0.5	0.02	0.005	0.05	0.388	160	145.4748	0.0355	0.0131	1.06	0.0492	0.00001	0.000005	0.09	0.00005	0.000005	27.6	0.0001	0.000887	0.00175	0.00005
19-May-10	5	500	420	8.42	272	130	27	--	--	114	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	25	--	--	--	--
26-May-10	6	500	470	8.35	215	135	18	--	--	93	--	--	--	--	--	--	--	--	0.06	--	--	--	--	--	--	--	--	19.4	--	--	--	--
2-Jun-10	7	500	475	8.41	219	140	18	--	--	97	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	20.9	--	--	--	--
9-Jun-10	8	500	450	8.36	254	130	19	--	--	112	0.16	0.5	0.02	0.005	0.12	0.336	130	126.2423	0.05	0.0092	0.831	0.0755	0.00005	0.00003	0.3	0.0003	0.00003	22.7	0.0005	0.00068	0.0004	0.0003
16-Jun-10	9	500	500	8.36	238	130	15	--	--	110	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	22	--	--	--	--
23-Jun-10	10	500	440	8.3	161	145	8	--	--	75	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	15.9	--	--	--	--
30-Jun-10	11	500	440	8.32	223	135	17	--	--	101	--	--	--	--	--	--	--	--	0.05	--	--	--	--	--	--	--	--	22.9	--	--	--	--
7-Jul-10	12	500	455	8.37	231	130	18	--	--	106	0.09	0.5	0.02	0.005	0.05	0.292	140	117.821	0.0437	0.00779	0.754	0.0877	0.00001	0.000005	0.05	0.000005	0.000005	21.8	0.0001	0.000552	0.00032	0.00005
14-Jul-10	13	500	470	8.33	226	135	22	--	--	100	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	24.7	--	--	--	--
21-Jul-10	14	500	415	8.36	236	130	26	--	--	98	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	26.2	--	--	--	--
28-Jul-10	15	500	480	8.35	256	130	34	--	--	99	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	25.4	--	--	--	--
4-Aug-10	16	500	415	8.3	173	150	25	--	--	58	0.05	0.5	0.02	0.005	0.27	0.05	92	80.58788	0.0393	0.00328	0.323	0.0563	0.00001	0.000005	0.05	0.00005	0.000005	16.4	0.0004	0.000414	0.00106	0.00005
11-Aug-10	17	500	480	8.29	295	140	52	--	1	108	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	33.2	--	--	--	--
18-Aug-10	18	500	455	8.31	270	140	49	--	--	96	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	28.6	--	--	--	--
25-Aug-10	19	500	460	8.26	268	140	42	--	1	95	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	28.7	--	--	--	--
1-Sep-10	20	500	415	8.16	245	135	41	--	1	88	0.06	0.5	0.02	0.005	0.05	0.135	140	121.904	0.0478	0.00413	0.378	0.0736	0.00001	0.000005	0.05	0.00005	0.000009	23.6	0.0001	0.000475	0.00046	0.00005
8-Sep-10	21	500	475	8.22	260	135	44	--	1	95	--	--	--	--	--	--	--	--	0.05	--	--	--	--	--	--	--	--	27.2	--	--	--	--
15-Sep-10	22	500	445	8.27	236	140	36	--	1	91	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	24.5	--	--	--	--
22-Sep-10	23	500	480	8.25	250	140	36	--	1	98	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	25.4	--	--	--	--
29-Sep-10	24	500	415	8.15	236	140	39	--	1	94	0.03	0.7	0.02	0.005	0.05	0.103	120	124.4147	0.0451	0.0039	0.32	0.0684	0.00001	0.000005	0.05	0.00014	0.000005	25.1	0.0003	0.000345	0.0016	0.00005
6-Oct-10	25	500	470	8.24	261	140	37	--	1	104	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	26	--	--	--	--
13-Oct-10	26	500	445	8.2	205	140	22	--	1	78	--	--	--	--	--	--	--	--	0.07	--	--	--	--	--	--	--	--	19	--	--	--	--
20-Oct-10	27	500	445	8.21	246	140	32	--	1	91	--	--	--	--	--	--	--	--	0.05	--	--	--	--	--	--	--	--	22.6	--	--	--	--
27-Oct-10	28	500	485	8.15	151	145	13	--	1	57	0.03	0.5	0.02	0.005	0.05	0.025	76	67.0628	0.0398	0.00169	0.12	0.0362	0.00001	0.000005	0.05	0.00005	0.000005	14	0.0002	0.000227	0.00036	0.00005
3-Nov-10	29	500	420	8.12	157	160	22	--	1	56	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	14.4	--	--	--	

Appendix G: Kinetic Data, Humidity Cell Tests

Naartok West
HC-56 Flotation Tailings

Concentrations																																	
Sampling Date	Week No.	Input Vol. ml	Output Vol. ml	pH pH Units	EC µS/cm	ORP mV	SO4 mg/L	Acidity to pH 4.5 mg CaCO3/L	Acidity to pH 8.3 mg CaCO3/L	Alkalinity mg CaCO3	Fluoride mg/L	Chloride mg/L	Nitrate-N mg/L	Nitrite-N mg/L	Total Ammonia mgN/L	Diss.-P mgP/L	TDS mg/L	Hardness CaCO3 mg/L	Al mg/L	Sb mg/L	As mg/L	Ba mg/L	Be mg/L	Bi mg/L	B mg/L	Cs mg/L	Cd mg/L	Ca mg/L	Cr mg/L	Co mg/L	Cu mg/L	La mg/L	
Detection Limits		5	5	0.01	1.0	50	1.0	1.0	1.0	1.0	0.1	0.2	0.02	0.002	0.01	0.001	10	Calculation	0.001	0.0001	0.0002	0.0002	0.0001	0.0001	0.005	0.0001	0.00001	0.01	0.0002	0.0001	0.0001	0.0001	
26-Oct-11	80	500	480	8.29	215	205	3.97	--	1	100	0.01	1.9	0.03	0.005	0.025	0.023	110	105	0.0318	0.00137	0.0878	0.0874	0.00001	0.000005	0.05	0.00005	0.000005	17	0.0002	0.000094	0.00006	0.00005	
2-Nov-11	81	500	430	8.35	220	220	3.6	--	--	94	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	15.8	--	--	--	--
9-Nov-11	82	500	455	8.32	205	215	4.7	--	--	88	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	16.5	--	--	--	--	
16-Nov-11	83	500	385	8.44	202	230	3.19	--	--	89	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	16.7	--	--	--	--	
23-Nov-11	84	500	470	8.32	224	260	4.75	--	--	92	0.01	1.3	0.323	0.005	0.15	0.05	104	94.5	0.0314	0.00129	0.0821	0.088	0.00001	0.000005	0.05	0.00005	0.000005	15.9	0.0002	0.000096	0.00022	0.00005	
30-Nov-11	85	500	450	8.3	196	160	3.85	--	--	88	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	16.6	--	--	--	--	
7-Dec-11	86	500	425	8.28	204	150	3.1	--	1	94	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	17	--	--	--	--	
14-Dec-11	87	500	435	8.36	245	120	4.17	--	1	109	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	18.9	--	--	--	--	
21-Dec-11	88	500	450	8.29	158	120	1.81	--	1	65	0.01	2.4	0.547	0.005	0.034	0.0171	82	68.5	0.0371	0.0008	0.0748	0.0605	0.00001	0.000005	0.05	0.00005	0.000005	12.5	0.0001	0.00007	0.00018	0.00005	
28-Dec-11	89	500	480	8.25	248	105	3.47	--	1	110	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	19.1	--	--	--	--	
4-Jan-12	90	500	435	8.15	157	120	2.97	--	1	70	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	13.6	--	--	--	--	
11-Jan-12	91	500	410	8.09	159	115	1.82	--	1	69	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	13.7	--	--	--	--	
18-Jan-12	92	500	455	8.25	164	115	3.02	--	1	77	0.011	2.1	0.726	0.005	0.036	0.0128	82	75.9	0.0471	0.00071	0.0528	0.0642	0.00001	0.000005	0.05	0.00005	0.000005	13.2	0.0002	0.000081	0.0005	0.00005	
25-Jan-12	93	500	435	8.16	155	110	2.52	--	1	66	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	12.3	--	--	--	--	
1-Feb-12	94	500	435	8.27	181	115	3.89	--	1	74	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	14.1	--	--	--	--	
8-Feb-12	95	500	470	8.33	234	110	4.1	--	--	94	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	16.2	--	--	--	--	
15-Feb-12	96	500	435	8.1	204	105	3.8	--	2	94	0.01	2.3	0.657	0.005	0.036	0.0178	116	92.8	0.0305	0.00104	0.0619	0.0873	0.00001	0.000005	0.05	0.00005	0.000006	14.3	0.0002	0.000089	0.00019	0.00005	
22-Feb-12	97	500	420	8.35	216	117	2.89	--	--	88	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	16.2	--	--	--	--	
Terminated																																	

Appendix G: Kinetic Data, Humidity Cell Tests

Naartok West
HC-56 Flotation Tailings

Concentrations																												
Sampling Date	Week No.																											
		Fe mg/L	Pb mg/L	Li mg/L	Mg mg/L	Mn mg/L	P mg/L	Hg mg/L	Mo mg/L	Ni mg/L	Re mg/L	K mg/L	Rb mg/L	Se mg/L	Si mg/L	Ag mg/L	Na mg/L	Sr mg/L	Te mg/L	Tl mg/L	Th mg/L	Sn mg/L	Ti mg/L	W mg/L	U mg/L	V mg/L	Zn mg/L	Zr mg/L
Detection Limits		0.01	0.00005	0.0001	0.005	0.0001	0.015	0.000002	0.0001	0.0002	0.0001	0.01	0.0001	0.0002	0.05	0.00004	0.005	0.0001	0.0002	0.00002	0.00005	0.0001	0.0002	0.0001	0.00005	0.0001	0.001	0.0001
14-Apr-10	0	0.005	0.0007	0.013	88.2	0.049	0.022	0.00002	0.053	0.000046	--	42.4	0.0184	0.0201	3.99	0.00007	25.2	0.566	0.001	0.00006	0.001	0.005	0.005	0.002	0.0003	0.005	0.005	0.0005
21-Apr-10	1	0.005	0.00012	0.007	25.2	0.0147	0.01	0.00002	0.0158	1.24E-05	--	16.4	0.0085	0.0029	7	0.00003	5.4	0.154	0.0001	0.00001	0.00003	0.00556	0.003	0.0019	0.00015	0.002	0.0018	0.0005
28-Apr-10	2	0.006	0.00114	0.006	15.6	0.0106	0.03	0.00002	0.0059	6.1E-06	--	11.2	0.0063	0.0016	4.3	0.00003	2.3	0.0977	0.0001	0.00002	0.00003	0.00459	0.003	0.00168	0.00009	0.003	0.0014	0.0005
5-May-10	3	0.01	--	--	17.1	--	--	--	--	--	--	10.7	--	--	--	--	2	--	--	--	--	--	--	--	--	--	--	--
12-May-10	4	0.002	0.00003	0.0061	18.6	0.0139	0.002	0.00002	0.00384	6.22E-06	--	10.6	0.00706	0.00142	4.9	0.000005	1.75	0.124	0.00002	0.000019	0.000005	0.00345	0.0005	0.00158	0.000068	0.0024	0.0004	0.0001
19-May-10	5	0.01	--	--	17.4	--	--	--	--	--	--	9.9	--	--	--	--	1.4	--	--	--	--	--	--	--	--	--	--	--
26-May-10	6	0.01	--	--	12.5	--	--	--	--	--	--	6.9	--	--	--	--	0.9	--	--	--	--	--	--	--	--	--	--	--
2-Jun-10	7	0.01	--	--	13.9	--	--	--	--	--	--	7.6	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--
9-Jun-10	8	0.005	0.00013	0.006	16.9	0.0128	0.01	0.00002	0.0032	4.2E-06	--	8.1	0.0068	0.001	4.1	0.00003	1.1	0.122	0.0001	0.00002	0.00003	0.00334	0.003	0.00117	0.00004	0.002	0.0005	0.0005
16-Jun-10	9	0.01	--	--	14.7	--	--	--	--	--	--	7.2	--	--	--	--	0.9	--	--	--	--	--	--	--	--	--	--	--
23-Jun-10	10	0.01	--	--	10	--	--	--	--	--	--	5.2	--	--	--	--	0.6	--	--	--	--	--	--	--	--	--	--	--
30-Jun-10	11	0.01	--	--	15.1	--	--	--	--	--	--	7.3	--	--	--	--	0.8	--	--	--	--	--	--	--	--	--	--	--
7-Jul-10	12	0.003	0.00003	0.0048	15.4	0.0122	0.002	0.00002	0.00367	2.99E-06	--	7.59	0.00623	0.00068	4.1	0.000005	0.81	0.121	0.00002	0.000016	0.000005	0.00231	0.0005	0.00107	0.000042	0.002	0.0005	0.0001
14-Jul-10	13	0.01	--	--	16.6	--	--	--	--	--	--	7.5	--	--	--	--	0.8	--	--	--	--	--	--	--	--	--	--	--
21-Jul-10	14	0.01	--	--	17.6	--	--	--	--	--	--	7.7	--	--	--	--	0.8	--	--	--	--	--	--	--	--	--	--	--
28-Jul-10	15	0.01	--	--	16.2	--	--	--	--	--	--	6.7	--	--	--	--	0.7	--	--	--	--	--	--	--	--	--	--	--
4-Aug-10	16	0.008	0.000053	0.0026	9.63	0.0138	0.007	0.00002	0.00352	2.2E-06	--	4.07	0.00403	0.00066	2.2	0.000007	0.45	0.0777	0.00002	0.00001	0.000005	0.00264	0.0005	0.00032	0.000027	0.0008	0.0008	0.0001
11-Aug-10	17	0.01	--	--	21.4	--	--	--	--	--	--	7.9	--	--	--	--	0.8	--	--	--	--	--	--	--	--	--	--	--
18-Aug-10	18	0.01	--	--	17.5	--	--	--	--	--	--	6.7	--	--	--	--	0.6	--	--	--	--	--	--	--	--	--	--	--
25-Aug-10	19	0.01	--	--	17.9	--	--	--	--	--	--	6.8	--	--	--	--	0.7	--	--	--	--	--	--	--	--	--	--	--
1-Sep-10	20	0.007	0.00002	0.0035	15.3	0.0048	0.002	0.00002	0.00643	2.99E-06	--	6.04	0.00644	0.00055	2.8	0.000005	0.58	0.11	0.00002	0.000015	0.000005	0.00292	0.0005	0.00046	0.000059	0.0012	0.0003	0.0001
8-Sep-10	21	0.01	--	--	17	--	--	--	--	--	--	6.3	--	--	--	--	0.6	--	--	--	--	--	--	--	--	--	--	--
15-Sep-10	22	0.01	--	--	15.3	--	--	--	--	--	--	6	--	--	--	--	0.5	--	--	--	--	--	--	--	--	--	--	--
22-Sep-10	23	0.01	--	--	16.5	--	--	--	--	--	--	6.1	--	--	--	--	0.7	--	--	--	--	--	--	--	--	--	--	--
29-Sep-10	24	0.055	0.000061	0.0036	15	0.00351	0.002	0.00002	0.00551	2.38E-06	--	5.46	0.00688	0.00049	2.9	0.000005	0.54	0.101	0.00002	0.000015	0.000005	0.00254	0.0005	0.00049	0.000045	0.0011	0.0003	0.0001
6-Oct-10	25	0.01	--	--	16.7	--	--	--	--	--	--	5.5	--	--	--	--	0.6	--	--	--	--	--	--	--	--	--	--	--
13-Oct-10	26	0.04	--	--	11.9	--	--	--	--	--	--	3.8	--	--	--	--	0.4	--	--	--	--	--	--	--	--	--	--	--
20-Oct-10	27	0.01	--	--	14.7	--	--	--	--	--	--	4.3	--	--	--	--	0.5	--	--	--	--	--	--	--	--	--	--	--
27-Oct-10	28	0.016	0.000037	0.0016	7.8	0.00838	0.002	0.000011	0.00261	1.6E-06	--	2.58	0.00358	0.00016	1.5	0.000005	0.24	0.0498	0.00002	0.000007	0.000005	0.00151	0.0005	0.00023	0.000012	0.0003	0.0006	0.0001
3-Nov-10	29	0.01	--	--	9.03	--	--	--	--	--	--	2.3	--	--	--	--	0.3	--	--	--	--	--	--	--	--	--	--	--
10-Nov-10	30	0.01	--	--	9.09	--	--	--	--	--	--	2.4	--	--	--	--	0.3	--	--	--	--	--	--	--	--	--	--	--
17-Nov-10	31	0.03	--	--	13.6	--	--	--	--	--	--	3.6	--	--	--	--	0.5	--	--	--	--	--	--	--	--	--	--	--
24-Nov-10	32	0.002	0.000015	0.0033	16.9	0.00244	0.002	0.000007	0.00678	2.16E-06	--	4.92	0.00643	0.00074	3	0.000005	0.61	0.094	0.00002	0.000013	0.000005	0.00237	0.0009	0.00054	0.000042	0.0008	0.0001	0.0001
1-Dec-10	33	0.01	--	--	15.9	--	--	--	--	--	--	4	--	--	--	--	0.5	--	--	--	--	--	--	--	--	--	--	--
8-Dec-10	34	0.06	--	--	11.7	--	--	--	--	--	--	3.3	--	--	--	--	0.6	--	--	--	--	--	--	--	--	--	--	--
15-Dec-10	35	0.01	--	--	11.9	--	--	--	--	--	--	3.1	--	--	--	--	0.2	--	--	--	--	--	--	--	--	--	--	--
22-Dec-10	36	0.01	0.0000																									

Appendix G: Kinetic Data, Humidity Cell Tests

Naartok West
HC-56 Flotation Tailings

Concentrations																												
Sampling Date	Week No.	Fe mg/L	Pb mg/L	Li mg/L	Mg mg/L	Mn mg/L	P mg/L	Hg mg/L	Mo mg/L	Ni mg/L	Re mg/L	K mg/L	Rb mg/L	Se mg/L	Si mg/L	Ag mg/L	Na mg/L	Sr mg/L	Te mg/L	Tl mg/L	Th mg/L	Sn mg/L	Ti mg/L	W mg/L	U mg/L	V mg/L	Zn mg/L	Zr mg/L
		0.01	0.00005	0.0001	0.005	0.0001	0.015	0.000002	0.0001	0.0002	0.0001	0.01	0.0001	0.0002	0.05	0.00004	0.005	0.0001	0.0002	0.00002	0.00005	0.0001	0.0002	0.0001	0.00005	0.0001	0.001	0.0001
Detection Limits		0.01	0.03	--	0.05	0.003	0.15	--	0.02	0.02	0.15	0.25	--	--	0.05	0.01	0.1	0.001	--	--	--	0.03	0.005	--	--	0.01	0.005	0.02
26-Oct-11	80	0.002	0.000009	0.002	15.1	0.00153	0.002	0.000002	0.00088	9.9E-07	--	2.95	0.00516	0.00019	1.9	0.000005	0.35	0.0663	0.00002	0.000009	0.000005	0.00113	0.0005	0.00025	0.000008	0.0002	0.0002	0.0001
2-Nov-11	81	0.01	--	--	14.4	--	--	--	--	--	--	2.9	--	--	--	--	0.6	--	--	--	--	--	--	--	--	--	--	--
9-Nov-11	82	0.01	--	--	14.6	--	--	--	--	--	--	2.3	--	--	--	--	0.4	--	--	--	--	--	--	--	--	--	--	--
16-Nov-11	83	0.01	--	--	15.3	--	--	--	--	--	--	2.3	--	--	--	--	0.7	--	--	--	--	--	--	--	--	--	--	--
23-Nov-11	84	0.003	0.000035	0.0018	13.3	0.00137	0.002	0.000002	0.00087	9.5E-07	--	2.68	0.00519	0.00013	1.7	0.000005	0.32	0.0629	0.00002	0.000007	0.000005	0.00121	0.0005	0.00026	0.000005	0.0003	0.0004	0.0001
30-Nov-11	85	0.01	--	--	15	--	--	--	--	--	--	2.4	--	--	--	--	0.3	--	--	--	--	--	--	--	--	--	--	--
7-Dec-11	86	0.02	--	--	15.3	--	--	--	--	--	--	2.2	--	--	--	--	0.3	--	--	--	--	--	--	--	--	--	--	--
14-Dec-11	87	0.01	--	--	18.1	--	--	--	--	--	--	2.2	--	--	--	--	0.3	--	--	--	--	--	--	--	--	--	--	--
21-Dec-11	88	0.005	0.000017	0.0011	9.05	0.00213	0.006	0.000002	0.00047	7.7E-07	--	1.4	0.00344	0.00008	1.1	0.000005	0.17	0.045	0.00002	0.000005	0.000005	0.00244	0.0005	0.00021	0.000003	0.0003	0.0003	0.0001
28-Dec-11	89	0.01	--	--	18.1	--	--	--	--	--	--	2.4	--	--	--	--	0.4	--	--	--	--	--	--	--	--	--	--	--
4-Jan-12	90	0.01	--	--	10.8	--	--	--	--	--	--	1.5	--	--	--	--	0.3	--	--	--	--	--	--	--	--	--	--	--
11-Jan-12	91	0.01	--	--	10.5	--	--	--	--	--	--	1.3	--	--	--	--	0.3	--	--	--	--	--	--	--	--	--	--	--
18-Jan-12	92	0.006	0.000018	0.0011	10.4	0.00277	0.002	0.000002	0.00062	8.5E-07	--	1.82	0.00383	0.00014	1.3	0.000005	0.24	0.0453	0.00002	0.000007	0.000005	0.0014	0.0005	0.00015	0.000003	0.0004	0.0003	0.0001
25-Jan-12	93	0.01	--	--	10.2	--	--	--	--	--	--	1.4	--	--	--	--	0.2	--	--	--	--	--	--	--	--	--	--	--
1-Feb-12	94	0.01	--	--	12.4	--	--	--	--	--	--	1.3	--	--	--	--	0.4	--	--	--	--	--	--	--	--	--	--	--
8-Feb-12	95	0.01	--	--	15.8	--	--	--	--	--	--	2.1	--	--	--	--	0.6	--	--	--	--	--	--	--	--	--	--	--
15-Feb-12	96	0.005	0.000026	0.0017	13.9	0.00189	0.005	0.000002	0.00095	9E-07	--	2.34	0.0045	0.00011	1.4	0.00001	0.32	0.0574	0.00002	0.000006	0.000005	0.0016	0.0005	0.00023	0.000009	0.0004	0.0009	0.0001
22-Feb-12	97	0.01	--	--	15.5	--	--	--	--	--	--	2	--	--	--	--	0.5	--	--	--	--	--	--	--	--	--	--	--
Terminated																												

Appendix G: Kinetic Data, Humidity Cell Tests

Naartok West
HC-56 Flotation Tailings

Loading Calculations																														
Sampling Date	Week No.	SO4 mg/kg/wk	Acidity to pH 4.5 mg/kg/wk	Acidity to pH 8.3 mg/kg/wk	Total Alkalinity to pH 4.5 mg/kg/wk	Fluoride mg/kg/wk	Chloride mg/kg/wk	Nitrate-N mg/kg/wk	Nitrite-N mg/kg/wk	Total Ammonia mg/kg/wk	Diss.-P mg/kg/wk	TDS mg/kg/wk	Hardness CaCO3 mg/kg/wk	Al mg/kg/wk	Sb mg/kg/wk	As mg/kg/wk	Ba mg/kg/wk	Be mg/kg/wk	Bi mg/kg/wk	B mg/kg/wk	Cs mg/kg/wk	Cd mg/kg/wk	Ca mg/kg/wk	Cr mg/kg/wk	Co mg/kg/wk	Cu mg/kg/wk	La mg/kg/wk	Fe mg/kg/wk	Pb mg/kg/wk	
Detection Limits																														
14-Apr-10	0	381.3	--	--	23.78	0.123	5.33	0.0287	0.04223	0.0779	0.10127	492	305.479602	0.00943	0.009102	0.35137	0.01148	0.000041	0.00041	0.09225	0.000082	0.0000738	62.73	0.00492	0.001968	0.003157	0.000082	0.00205	0.000287	
21-Apr-10	1	57.54	--	0.42	44.52	0.1344	0.294	0.0126	0.00672	0.0714	0.168	92.4	83.415864	0.01344	0.007098	0.5544	0.008988	0.000021	0.0000126	0.126	0.000126	0.0000126	15.96	0.00021	0.000567	0.001764	0.000084	0.0021	0.0000504	
28-Apr-10	2	23.5	--	--	43.5	0.135	0.25	0.01	0.0025	0.0025	0.199	65	61.8191	0.0265	0.006	0.54	0.01325	0.000025	0.000015	0.15	0.00015	0.000015	11.9	0.00025	0.00038	0.00085	0.00015	0.003	0.00057	
5-May-10	3	17	--	--	42.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	10.54	--	--	--	--	--	0.00425	--
12-May-10	4	17.15	--	--	60.27	0.1078	0.245	0.0098	0.00245	0.0245	0.19012	78.4	71.282652	0.017395	0.006419	0.5194	0.024108	0.0000049	0.00000245	0.0441	0.0000245	0.00000245	13.524	0.000049	0.00043463	0.0008575	0.0000245	0.00098	0.0000147	
19-May-10	5	11.34	--	--	47.88	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	10.5	--	--	--	--	--	0.0042	--
26-May-10	6	8.46	--	--	43.71	--	--	--	--	--	--	--	--	0.0282	--	--	--	--	--	--	--	--	9.118	--	--	--	--	--	0.0047	--
2-Jun-10	7	8.55	--	--	46.075	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	9.9275	--	--	--	--	--	0.00475	--
9-Jun-10	8	8.55	--	--	50.4	0.072	0.225	0.009	0.00225	0.054	0.1512	58.5	56.809035	0.0225	0.00414	0.37395	0.033975	0.0000225	0.0000135	0.135	0.000135	0.0000135	10.215	0.000225	0.000306	0.00018	0.000135	0.00225	0.0000585	
16-Jun-10	9	7.5	--	--	55	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	11	--	--	--	--	--	0.005	--
23-Jun-10	10	3.52	--	--	33	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6.996	--	--	--	--	--	0.0044	--
30-Jun-10	11	7.48	--	--	44.44	--	--	--	--	--	--	--	--	0.022	--	--	--	--	--	--	--	--	10.076	--	--	--	--	--	0.0044	--
7-Jul-10	12	8.19	--	--	48.23	0.04095	0.2275	0.0091	0.002275	0.02275	0.13286	63.7	53.608555	0.0198835	0.00354445	0.34307	0.0399035	0.00000455	2.275E-06	0.02275	2.275E-06	2.275E-06	9.919	0.0000455	0.00025116	0.0001456	0.00002275	0.001365	0.00001365	
14-Jul-10	13	10.34	--	--	47	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	11.609	--	--	--	--	--	0.0047	--
21-Jul-10	14	10.79	--	--	40.67	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	10.873	--	--	--	--	--	0.00415	--
28-Jul-10	15	16.32	--	--	47.52	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	12.192	--	--	--	--	--	0.0048	--
4-Aug-10	16	10.375	--	--	24.07	0.02075	0.2075	0.0083	0.002075	0.11205	0.02075	38.18	33.4439702	0.0163095	0.0013612	0.134045	0.0233645	0.00000415	2.075E-06	0.02075	0.00002075	2.075E-06	6.806	0.000166	0.00017181	0.0004399	0.00002075	0.00332	2.1995E-05	
11-Aug-10	17	24.96	--	0.48	51.84	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	15.936	--	--	--	--	--	0.0048	--
18-Aug-10	18	22.295	--	--	43.68	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	13.013	--	--	--	--	--	0.00455	--
25-Aug-10	19	19.32	--	0.46	43.7	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	13.202	--	--	--	--	--	0.0046	--
1-Sep-10	20	17.015	--	0.415	36.52	0.0249	0.2075	0.0083	0.002075	0.02075	0.056025	58.1	50.59016	0.019837	0.00171395	0.15687	0.030544	0.00000415	2.075E-06	0.02075	0.00002075	3.735E-06	9.794	0.0000415	0.00019713	0.0001909	0.00002075	0.002905	0.0000083	
8-Sep-10	21	20.9	--	0.475	45.125	--	--	--	--	--	--	--	--	0.02375	--	--	--	--	--	--	--	--	12.92	--	--	--	--	--	0.00475	--
15-Sep-10	22	16.02	--	0.445	40.495	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	10.9025	--	--	--	--	--	0.00445	--
22-Sep-10	23	17.28	--	0.48	47.04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	12.192	--	--	--	--	--	0.0048	--
29-Sep-10	24	16.185	--	0.415	39.01	0.01245	0.2905	0.0083	0.002075	0.02075	0.042745	49.8	51.6321005	0.0187165	0.0016185	0.1328	0.028386	0.00000415	2.075E-06	0.02075	0.0000581	2.075E-06	10.4165	0.0001245	0.00014318	0.000664	0.00002075	0.022825	2.5315E-05	
6-Oct-10	25	17.39	--	0.47	48.88	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	12.22	--	--	--	--	--	0.0047	--
13-Oct-10	26	9.79	--	0.445	34.71	--	--	--	--	--	--	--	--	0.03115	--	--	--	--	--	--	--	--	8.455	--	--	--	--	--	0.0178	--
20-Oct-10	27	14.24	--	0.445	40.495	--	--	--	--	--	--	--	--	0.02225	--	--	--	--	--	--	--	--	10.057	--	--	--	--	--	0.00445	--
27-Oct-10	28	6.305	--	0.485	27.645	0.01455	0.2425	0.0097	0.002425	0.02425	0.012125	36.86	32.525458	0.019303	0.00081965	0.0582	0.017557	0.00000485	2.425E-06	0.02425	0.00002425	2.425E-06	6.79	0.000097	0.0001101	0.0001746	0.00002425	0.00776	1.7945E-05	
3-Nov-10	29	9.24	--	0.42	23.52	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6.048	--	--	--	--	--	0.0042</	

Appendix G: Kinetic Data, Humidity Cell Tests

Naartok West
HC-56 Flotation Tailings

Loading Calculations																													
Sampling Date	Week No.	SO4 mg/kg/wk	Acidity to pH 4.5 mg/kg/wk	Acidity to pH 8.3 mg/kg/wk	Total Alkalinity to pH 4.5 mg/kg/wk	Fluoride mg/kg/wk	Chloride mg/kg/wk	Nitrate-N mg/kg/wk	Nitrite-N mg/kg/wk	Total Ammonia mg/kg/wk	Diss.-P mg/kg/wk	TDS mg/kg/wk	Hardness CaCO3 mg/kg/wk	Al mg/kg/wk	Sb mg/kg/wk	As mg/kg/wk	Ba mg/kg/wk	Be mg/kg/wk	Bi mg/kg/wk	B mg/kg/wk	Cs mg/kg/wk	Cd mg/kg/wk	Ca mg/kg/wk	Cr mg/kg/wk	Co mg/kg/wk	Cu mg/kg/wk	La mg/kg/wk	Fe mg/kg/wk	Pb mg/kg/wk
Detection Limits																													
23-Nov-11	84	2.2325	--	--	43.24	0.0047	0.611	0.15181	0.00235	0.0705	0.0235	48.88	44.415	0.014758	0.0006063	0.038587	0.04136	0.0000047	0.00000235	0.0235	0.0000235	0.00000235	7.473	0.000094	0.00004512	0.0001034	0.0000235	0.00141	0.00001645
30-Nov-11	85	1.7325	--	--	39.6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.47	--	--	--	--	0.0045	--
7-Dec-11	86	1.3175	--	0.425	39.95	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.225	--	--	--	--	0.0085	--
14-Dec-11	87	1.81395	--	0.435	47.415	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	8.2215	--	--	--	--	0.00435	--
21-Dec-11	88	0.8145	--	0.45	29.25	0.0045	1.08	0.24615	0.00225	0.0153	0.007695	36.9	30.825	0.016695	0.00036	0.03366	0.027225	0.0000045	0.00000225	0.0225	0.0000225	0.00000225	5.625	0.000045	0.0000315	0.000081	0.0000225	0.00225	0.00000765
28-Dec-11	89	1.6656	--	0.48	52.8	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	9.168	--	--	--	--	0.0048	--
4-Jan-12	90	1.29195	--	0.435	30.45	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5.916	--	--	--	--	0.00435	--
11-Jan-12	91	0.7462	--	0.41	28.29	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5.617	--	--	--	--	0.0041	--
18-Jan-12	92	1.3741	--	0.455	35.035	0.005005	0.9555	0.33033	0.002275	0.01638	0.005824	37.31	34.5345	0.0214305	0.00032305	0.024024	0.029211	0.00000455	2.275E-06	0.02275	0.00002275	2.275E-06	6.006	0.000091	3.6855E-05	0.0002275	0.00002275	0.00273	0.00000819
25-Jan-12	93	1.0962	--	0.435	28.71	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5.3505	--	--	--	--	0.00435	--
1-Feb-12	94	1.69215	--	0.435	32.19	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6.1335	--	--	--	--	0.00435	--
8-Feb-12	95	1.927	--	--	44.18	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.614	--	--	--	--	0.0047	--
15-Feb-12	96	1.653	--	0.87	40.89	0.00435	1.0005	0.285795	0.002175	0.01566	0.007743	50.46	40.368	0.0132675	0.0004524	0.0269265	0.0379755	0.00000435	2.175E-06	0.02175	0.00002175	0.00000261	6.2205	0.000087	3.8715E-05	0.00008265	0.00002175	0.002175	0.00001131
22-Feb-12	97	1.2138	--	--	36.96	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6.804	--	--	--	--	0.0042	--
Terminated																													

Appendix G: Kinetic Data, Humidity Cell Tests

Naartok West
HC-56 Flotation Tailings

Loading Calculations																											
Sampling Date	Week No.	Li	Mg	Mn	P	Hg (by CVAF)	Mo	Ni	Re	K	Rb	Se	Si	Ag	Na	Sr	Te	Tl	Th	Sn	Ti	W	U	V	Zn	Zr	
		mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	
Detection Limits																											
14-Apr-10	0	0.00533	36.162	0.02009	0.00902	0.0000082	0.02173	0.00001886	--	17.384	0.007544	0.008241	1.6359	0.0000287	10.332	0.23206	0.00041	0.0000246	0.00041	0.00205	0.00205	0.00082	0.000123	0.00205	0.00205	0.000205	
21-Apr-10	1	0.00294	10.584	0.006174	0.0042	0.0000084	0.006636	5.208E-06	--	6.888	0.00357	0.001218	2.94	0.0000126	2.268	0.06468	0.000042	0.0000042	0.0000126	0.0023352	0.00126	0.000798	0.000063	0.00084	0.000756	0.00021	
28-Apr-10	2	0.003	7.8	0.0053	0.015	0.00001	0.00295	0.00000305	--	5.6	0.00315	0.0008	2.15	0.000015	1.15	0.04885	0.00005	0.000015	0.000015	0.002295	0.0015	0.00084	0.000045	0.0015	0.0007	0.00025	
5-May-10	3	--	7.2675	--	--	--	--	--	--	4.5475	--	--	--	--	0.85	--	--	--	--	--	--	--	--	--	--	--	--
12-May-10	4	0.002989	9.114	0.006811	0.00098	0.0000098	0.0018816	3.0478E-06	--	5.194	0.0034594	0.0006958	2.401	0.00000245	0.8575	0.06076	0.0000098	0.00000931	0.00000245	0.0016905	0.000245	0.0007742	0.00003332	0.001176	0.000196	0.000049	
19-May-10	5	--	7.308	--	--	--	--	--	--	4.158	--	--	--	--	0.588	--	--	--	--	--	--	--	--	--	--	--	--
26-May-10	6	--	5.875	--	--	--	--	--	--	3.243	--	--	--	--	0.423	--	--	--	--	--	--	--	--	--	--	--	--
2-Jun-10	7	--	6.6025	--	--	--	--	--	--	3.61	--	--	--	--	0.475	--	--	--	--	--	--	--	--	--	--	--	--
9-Jun-10	8	0.0027	7.605	0.00576	0.0045	0.000009	0.00144	0.00000189	--	3.645	0.00306	0.00045	1.845	0.0000135	0.495	0.0549	0.000045	0.000009	0.0000135	0.001503	0.00135	0.0005265	0.000018	0.0009	0.000225	0.000225	
16-Jun-10	9	--	7.35	--	--	--	--	--	--	3.6	--	--	--	--	0.45	--	--	--	--	--	--	--	--	--	--	--	--
23-Jun-10	10	--	4.4	--	--	--	--	--	--	2.288	--	--	--	--	0.264	--	--	--	--	--	--	--	--	--	--	--	--
30-Jun-10	11	--	6.644	--	--	--	--	--	--	3.212	--	--	--	--	0.352	--	--	--	--	--	--	--	--	--	--	--	--
7-Jul-10	12	0.002184	7.007	0.005551	0.00091	0.0000091	0.00166985	1.3605E-06	--	3.45345	0.00283465	0.0003094	1.8655	2.275E-06	0.36855	0.055055	0.0000091	0.00000728	2.275E-06	0.00105105	0.0002275	0.00048685	0.00001911	0.00091	0.0002275	0.0000455	
14-Jul-10	13	--	7.802	--	--	--	--	--	--	3.525	--	--	--	--	0.376	--	--	--	--	--	--	--	--	--	--	--	--
21-Jul-10	14	--	7.304	--	--	--	--	--	--	3.1955	--	--	--	--	0.332	--	--	--	--	--	--	--	--	--	--	--	--
28-Jul-10	15	--	7.776	--	--	--	--	--	--	3.216	--	--	--	--	0.336	--	--	--	--	--	--	--	--	--	--	--	--
4-Aug-10	16	0.001079	3.99645	0.005727	0.002905	0.0000083	0.0014608	9.13E-07	--	1.68905	0.00167245	0.0002739	0.913	2.905E-06	0.18675	0.0322455	0.0000083	0.00000415	2.075E-06	0.0010956	0.0002075	0.0001328	1.1205E-05	0.000332	0.000332	0.0000415	
11-Aug-10	17	--	10.272	--	--	--	--	--	--	3.792	--	--	--	--	0.384	--	--	--	--	--	--	--	--	--	--	--	--
18-Aug-10	18	--	7.9625	--	--	--	--	--	--	3.0485	--	--	--	--	0.273	--	--	--	--	--	--	--	--	--	--	--	--
25-Aug-10	19	--	8.234	--	--	--	--	--	--	3.128	--	--	--	--	0.322	--	--	--	--	--	--	--	--	--	--	--	--
1-Sep-10	20	0.0014525	6.3495	0.001992	0.00083	0.0000083	0.00266845	1.2409E-06	--	2.5066	0.0026726	0.00022825	1.162	2.075E-06	0.2407	0.04565	0.0000083	6.225E-06	2.075E-06	0.0012118	0.0002075	0.0001909	2.4485E-05	0.000498	0.0001245	0.0000415	
8-Sep-10	21	--	8.075	--	--	--	--	--	--	2.9925	--	--	--	--	0.285	--	--	--	--	--	--	--	--	--	--	--	--
15-Sep-10	22	--	6.8085	--	--	--	--	--	--	2.67	--	--	--	--	0.2225	--	--	--	--	--	--	--	--	--	--	--	--
22-Sep-10	23	--	7.92	--	--	--	--	--	--	2.928	--	--	--	--	0.336	--	--	--	--	--	--	--	--	--	--	--	--
29-Sep-10	24	0.001494	6.225	0.00145665	0.00083	0.0000083	0.00228665	9.877E-07	--	2.2659	0.0028552	0.00020335	1.2035	2.075E-06	0.2241	0.041915	0.0000083	6.225E-06	2.075E-06	0.0010541	0.0002075	0.00020335	1.8675E-05	0.0004565	0.0001245	0.0000415	
6-Oct-10	25	--	7.849	--	--	--	--	--	--	2.585	--	--	--	--	0.282	--	--	--	--	--	--	--	--	--	--	--	--
13-Oct-10	26	--	5.2955	--	--	--	--	--	--	1.691	--	--	--	--	0.178	--	--	--	--	--	--	--	--	--	--	--	--
20-Oct-10	27	--	6.5415	--	--	--	--	--	--	1.9135	--	--	--	--	0.2225	--	--	--	--	--	--	--	--	--	--	--	--
27-Oct-10	28	0.000776	3.783	0.0040643	0.00097	5.335E-06	0.00126585	7.76E-07	--	1.2513	0.0017363	0.0000776	0.7275	2.425E-06	0.1164	0.024153	0.0000097	3.395E-06	2.425E-06	0.00073235	0.0002425	0.00011155	0.00000582	0.0001455	0.000291	0.0000485	
3-Nov-10	29	--	3.7926	--	--	--	--	--	--	0.966	--	--	--	--	0.126	--	--	--	--	--	--	--	--	--	--	--	--
10-Nov-10	30	--	3.86325	--	--	--	--	--	--	1.02	--	--	--	--	0.1275	--	--	--	--	--	--	--	--	--	--	--	--
17-Nov-10	31	--	5.916	--	--	--	--	--	--	1.566	--	--	--	--	0.2175	--	--	--	--	--	--	--	--	--	--	--	--
24-Nov-10	32	0.001386	7.098	0.0010248	0.00084	0.00000294	0.0028476	9.072E-07	--	2.0664	0.0027006	0.0003108	1.26	0.0000021	0.2562	0.03948	0.0000084	0.00000546	0.0000021	0.0009954	0.000378	0.0002268	0.00001764	0.000336	0.000042	0.000042	
1-Dec-10	33	--	7.632	--	--	--	--	--	--	1.92	--	--	--	--	0.24	--	--	--	--	--	--	--	--	--	--	--	--
8-Dec-10	34	--	4.9725	--	--	--	--	--	--	1.4025	--	--	--	--	0.255	--	--	--	--	--	--	--	--	--	--	--	--
15-Dec-10	35	--	5.0575	--	--	--	--	--	--	1.3175	--	--	--	--	0.085	--	--	--									

Appendix G: Kinetic Data, Humidity Cell Tests

Naartok West
HC-56 Flotation Tailings

Loading Calculations																											
Sampling Date	Week No.	Li	Mg	Mn	P	Hg (by CVAF)	Mo	Ni	Re	K	Rb	Se	Si	Ag	Na	Sr	Te	Ti	Th	Sn	Ti	W	U	V	Zn	Zr	
		mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	
Detection Limits																											
23-Nov-11	84	0.000846	6.251	0.0006439	0.00094	0.00000094	0.0004089	4.465E-07	--	1.2596	0.0024393	0.0000611	0.799	0.00000235	0.1504	0.029563	0.0000094	0.00000329	0.00000235	0.0005687	0.000235	0.0001222	0.00000235	0.000141	0.000188	0.000047	
30-Nov-11	85	--	6.75	--	--	--	--	--	--	1.08	--	--	--	--	0.135	--	--	--	--	--	--	--	--	--	--	--	
7-Dec-11	86	--	6.5025	--	--	--	--	--	--	0.935	--	--	--	--	0.1275	--	--	--	--	--	--	--	--	--	--	--	
14-Dec-11	87	--	7.8735	--	--	--	--	--	--	0.957	--	--	--	--	0.1305	--	--	--	--	--	--	--	--	--	--	--	
21-Dec-11	88	0.000495	4.0725	0.0009585	0.0027	0.0000009	0.0002115	3.465E-07	--	0.63	0.001548	0.000036	0.495	0.00000225	0.0765	0.02025	0.000009	0.00000225	0.00000225	0.001098	0.000225	0.0000945	0.00000135	0.000135	0.000135	0.000045	
28-Dec-11	89	--	8.688	--	--	--	--	--	--	1.152	--	--	--	--	0.192	--	--	--	--	--	--	--	--	--	--	--	
4-Jan-12	90	--	4.698	--	--	--	--	--	--	0.6525	--	--	--	--	0.1305	--	--	--	--	--	--	--	--	--	--	--	
11-Jan-12	91	--	4.305	--	--	--	--	--	--	0.533	--	--	--	--	0.123	--	--	--	--	--	--	--	--	--	--	--	
18-Jan-12	92	0.0005005	4.732	0.00126035	0.00091	0.00000091	0.0002821	3.8675E-07	--	0.8281	0.00174265	0.0000637	0.5915	2.275E-06	0.1092	0.0206115	0.0000091	3.185E-06	2.275E-06	0.000637	0.0002275	0.00006825	1.365E-06	0.000182	0.0001365	0.0000455	
25-Jan-12	93	--	4.437	--	--	--	--	--	--	0.609	--	--	--	--	0.087	--	--	--	--	--	--	--	--	--	--	--	
1-Feb-12	94	--	5.394	--	--	--	--	--	--	0.5655	--	--	--	--	0.174	--	--	--	--	--	--	--	--	--	--	--	
8-Feb-12	95	--	7.426	--	--	--	--	--	--	0.987	--	--	--	--	0.282	--	--	--	--	--	--	--	--	--	--	--	
15-Feb-12	96	0.0007395	6.0465	0.00082215	0.002175	0.00000087	0.00041325	3.915E-07	--	1.0179	0.0019575	0.00004785	0.609	0.00000435	0.1392	0.024969	0.0000087	0.00000261	2.175E-06	0.000696	0.0002175	0.00010005	3.915E-06	0.000174	0.0003915	0.0000435	
22-Feb-12	97	--	6.51	--	--	--	--	--	--	0.84	--	--	--	--	0.21	--	--	--	--	--	--	--	--	--	--	--	
Terminated																											

Appendix G: Kinetic Data, Humidity Cell Tests

Naartok West
CND Residue
HC-58 Tailings

Concentrations																																				
Sampling Date	Week No.	Input Vol. ml	Output Vol. ml	pH pH Units	EC µS/cm	ORP mV	SO4 mg/L	Acidity to pH 4.5 mg CaCO3/L	Acidity to pH 8.3 mg CaCO3/L	Alkalinity mg CaCO3	Fluoride mg/L	Chloride mg/L	Nitrate-N mg/L	Nitrite-N mg/L	Total Ammonia mgN/L	Diss.-P mgP/L	TDS mg/L	Total CN mg/L	WAD CN mg/L	Free CN mg/L	SCN mg/L	CNO mg/L	Hardness CaCO3 mg/L	Al mg/L	Sb mg/L	As mg/L	Ba mg/L	Be mg/L	Bi mg/L	B mg/L	Cs mg/L	Cd mg/L	Ca mg/L	Cr mg/L	Co mg/L	
Detection Limits		5	5	0.01	1.0	50	1.0	1.0	1.0	1.0	0.1	0.2	0.02	0.002	0.01	0.001	10	0.02	0.02	0.02	0.1	0.1	Calculation	0.001 0.05	0.0001 0.05	0.0002 0.03	0.0002 0.03	0.0001 0.003	0.0001 0.0001	0.005 0.01	0.0001 0.0001	0.00001 0.01	0.01 0.05	0.01 0.05	0.0001 0.0001	0.0001 0.0001
16-Jun-10	0	750	460	7.76	3950	140	3372	--	4	88	0.23	260	0.11	0.018	3.7	0.005	4000	0.09	0.02	0.02	--	0.1	2650	0.005	0.0059	0.141	0.0378	0.00005	0.00003	0.3	0.0003	0.00008	473	0.0005	0.12	
23-Jun-10	1	500	500	7.97	1340	150	717	--	3	63	0.11	42	0.02	0.007	0.71	0.01	1200	0.02	0.02	0.02	--	0.1	837	0.0026	0.0036	0.0894	0.011	0.00001	0.000005	0.05	0.00005	0.00003	229	0.0001	0.0604	
30-Jun-10	2	500	420	7.72	820	155	415	--	2	54	0.05	9.8	0.02	0.005	0.53	0.008	740	0.04	0.02	0.02	11.91	0.1	518	0.0035	0.00195	0.0287	0.00723	0.00001	0.000005	0.05	0.00005	0.000013	140	0.0001	0.0654	
7-Jul-10	3	500	425	7.7	1268	160	742	--	6	80	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	180	--	--	
14-Jul-10	4	500	480	7.67	1205	160	813	--	5	80	0.08	1.1	0.02	0.005	3.2	0.009	1300	0.02	0.02	0.02	2.21	0.1	938	0.0009	0.002	0.0188	0.0095	0.00001	0.000005	0.05	0.00005	0.000021	183	0.0002	0.235	
21-Jul-10	5	500	450	7.46	3370	140	2428	--	12	158	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	416	--	--		
28-Jul-10	6	500	430	7.52	1631	170	1037	--	8	77	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	186	--	--		
4-Aug-10	7	500	425	7.45	3100	140	2039	--	13	133	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	347	--	--		
11-Aug-10	8	500	500	7.49	1946	160	1068	--	7	89	0.12	0.5	0.02	0.005	2.6	0.008	1800	0.02	0.02	0.02	0.1	0.1	938	0.001	0.00121	0.00964	0.00948	0.00001	0.000005	0.05	0.00005	0.000037	236	0.0003	0.511	
18-Aug-10	9	500	440	7.24	1755	170	1023	--	9	74	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	171	--	--		
25-Aug-10	10	500	465	7.35	1755	160	1022	--	8	78	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	152	--	--		
1-Sep-10	11	500	455	7.48	2200	150	1388	--	9	90	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	194	--	--		
8-Sep-10	12	500	450	7.86	2370	145	1714	--	7	100	0.12	0.5	0.02	0.005	3.1	0.005	2300	0.02	0.02	0.02	0.1	0.1	1940	0.007	0.00073	0.00757	0.00855	0.00001	0.000005	0.05	0.00005	0.000033	266	0.0005	0.462	
15-Sep-10	13	500	425	7.48	2720	150	1685	--	9	99	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	244	--	--		
22-Sep-10	14	500	435	7.38	2480	150	1633	--	9	98	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	248	--	--		
29-Sep-10	15	500	460	7.43	2510	150	1456	--	8	92	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	205	--	--		
6-Oct-10	16	500	465	7.73	1955	150	1294	--	7	92	0.12	0.5	0.02	0.011	3.2	0.02	1900	0.02	0.02	0.02	0.1	0.1	1450	0.004	0.0005	0.0068	0.0069	0.00005	0.00003	0.3	0.0003	0.00004	227	0.0005	0.261	
13-Oct-10	17	500	455	7.65	2140	145	1426	--	9	84	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	205	--	--		
20-Oct-10	18	500	465	7.65	1910	145	1390	--	5	51	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	169	--	--		
27-Oct-10	19	500	445	7.57	2010	140	1217	--	6	76	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	193	--	--		
3-Nov-10	20	500	450	7.67	2070	150	1352	--	4	80	0.09	0.5	0.02	0.005	3.1	0.005	1800	--	--	--	0.1	0.1	1370	0.0018	0.00041	0.00558	0.00543	0.00001	0.000005	0.05	0.00005	0.000033	219	0.0001	0.179	
10-Nov-10	21	500	455	7.71	2140	140	1411	--	6	83	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.05	--	--	--	--	--	--	232	--	--		
17-Nov-10	22	500	445	7.74	1970	145	1119	--	5	73	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	200	--	--		
24-Nov-10	23	500	440	7.62	1683	145	1053	--	4	59	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	174	--	--		
1-Dec-10	24	500	435	7.72	1728	130	1127	--	5	73	0.09	0.8	0.02	0.005	3.1	0.006	1600	0.02	0.02	0.02	0.1	0.1	1280	0.0009	0.00038	0.00556	0.00453	0.00001	0.000005	0.05	0.00005	0.000021	229	0.0004	0.146	
8-Dec-10	25	500	450	7.8	1988	140	1274	--	7	75	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	209	--	--		
15-Dec-10	26	500	465	7.76	1985	135	1175	--	6	72	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	203	--	--		
22-Dec-10	27	500	430	7.75	1982	135	1164	--	6	78	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	209	--	--		
29-Dec-10	28	500	500	7.78	1930	145	1235	--	6	74	0.1																									

Appendix G: Kinetic Data, Humidity Cell Tests

HC-58	Naartok West CND Residue Tailings
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Concentrations																													
Sampling Date	Week No.	Concentrations																											
		Cu	La	Fe	Pb	Li	Mg	Mn	P	Hg	Mo	Ni	K	Rb	Se	Si	Ag	Na	Sr	Te	Ti	Th	Sn	Ti	W	U	V	Zn	Zr
		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Detection Limits		0.0001	0.0001	0.01	0.00005	0.0001	0.005	0.0001	0.015	0.000002	0.0001	0.0002	0.01	0.0001	0.0002	0.05	0.00004	0.005	0.0001	0.0002	0.00002	0.00005	0.0001	0.0002	0.0001	0.00005	0.0001	0.001	0.0001
		0.02	--	0.01	0.03	--	0.05	0.003	0.15	--	0.02	0.02	0.25	--	--	0.05	0.01	0.1	0.001	--	--	--	0.03	0.005	--	--	0.01	0.005	0.02
16-Jun-10	0	0.0104	0.0003	0.219	0.00064	0.04	356	0.642	0.08	0.00011	0.0327	0.581	23.4	0.0003	0.027	4.5	0.00009	216	1.38	0.0001	0.00001	0.00003	0.00563	0.003	0.00032	0.0004	0.001	0.0048	0.0005
23-Jun-10	1	0.00435	0.00005	0.037	0.00002	0.0149	64.2	0.344	0.013	0.00002	0.0115	0.46	5.73	0.0001	0.0087	3.6	0.00007	16.1	0.515	0.00002	0.000006	0.000005	0.00376	0.0005	0.00008	0.000166	0.0002	0.0027	0.0001
30-Jun-10	2	0.00364	0.00005	0.008	0.000017	0.0088	40.7	0.425	0.009	0.00002	0.00383	0.564	3.52	0.00006	0.00815	1.9	0.000005	4.69	0.309	0.00002	0.000003	0.000005	0.00229	0.0005	0.00001	0.000068	0.0002	0.0016	0.0001
7-Jul-10	3	--	--	0.01	--	--	86	--	--	--	--	8.3	--	--	--	--	5.5	--	--	--	--	--	--	--	--	--	--	--	--
14-Jul-10	4	0.00319	0.00005	0.006	0.000012	0.0136	117	1.01	0.004	0.00002	0.00238	1.77	8.2	0.00036	0.0279	1.7	0.000005	5.27	0.41	0.00002	0.000014	0.000005	0.00198	0.0005	0.00001	0.00007	0.0002	0.0022	0.0001
21-Jul-10	5	--	--	0.01	--	--	402	--	--	--	--	--	16.4	--	--	--	--	11.1	--	--	--	--	--	--	--	--	--	--	--
28-Jul-10	6	--	--	0.01	--	--	155	--	--	--	--	--	6.4	--	--	--	--	3.6	--	--	--	--	--	--	--	--	--	--	--
4-Aug-10	7	--	--	0.01	--	--	345	--	--	--	--	--	9.4	--	--	--	--	5.3	--	--	--	--	--	--	--	--	--	--	--
11-Aug-10	8	0.00246	0.00005	0.003	0.000083	0.0163	174	2.16	0.008	0.00002	0.00114	3.3	5.98	0.00039	0.0326	1.2	0.000005	3	0.506	0.00002	0.000016	0.000005	0.00191	0.0005	0.00001	0.000048	0.0002	0.0051	0.0001
18-Aug-10	9	--	--	0.01	--	--	163	--	--	--	--	--	4.4	--	--	--	--	1.9	--	--	--	--	--	--	--	--	--	--	--
25-Aug-10	10	--	--	0.01	--	--	169	--	--	--	--	--	3.9	--	--	--	--	1.7	--	--	--	--	--	--	--	--	--	--	--
1-Sep-10	11	--	--	0.01	--	--	237	--	--	--	--	--	4.9	--	--	--	--	2.1	--	--	--	--	--	--	--	--	--	--	--
8-Sep-10	12	0.00352	0.00005	0.015	0.000141	0.0171	311	2.96	0.01	0.00002	0.00069	2.49	5.26	0.00057	0.0325	1.5	0.000005	2.37	0.591	0.00002	0.000014	0.000005	0.00229	0.0005	0.00001	0.000031	0.0002	0.0042	0.0001
15-Sep-10	13	--	--	0.01	--	--	296	--	--	--	--	--	4.6	--	--	--	--	1.8	--	--	--	--	--	--	--	--	--	--	--
22-Sep-10	14	--	--	0.01	--	--	264	--	--	--	--	--	4.1	--	--	--	--	1.7	--	--	--	--	--	--	--	--	--	--	--
29-Sep-10	15	--	--	0.01	--	--	213	--	--	--	--	--	3.3	--	--	--	--	1.3	--	--	--	--	--	--	--	--	--	--	--
6-Oct-10	16	0.0024	0.0003	0.054	0.00011	0.012	216	1.92	0.01	0.000005	0.0004	1.41	3.2	0.0005	0.0172	1.5	0.00003	1.4	0.497	0.0001	0.00006	0.00003	0.00202	0.003	0.00005	0.00004	0.001	0.0032	0.0005
13-Oct-10	17	--	--	0.01	--	--	212	--	--	--	--	--	2.7	--	--	--	--	1.1	--	--	--	--	--	--	--	--	--	--	--
20-Oct-10	18	--	--	0.01	--	--	180	--	--	--	--	--	2.1	--	--	--	--	0.9	--	--	--	--	--	--	--	--	--	--	--
27-Oct-10	19	--	--	0.01	--	--	192	--	--	--	--	--	2.3	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--
3-Nov-10	20	0.00352	0.00005	0.009	0.000146	0.0094	200	1.52	0.006	0.000007	0.00035	0.874	2.47	0.00042	0.0118	1.2	0.000011	1.09	0.515	0.00002	0.000019	0.000007	0.00256	0.0005	0.00001	0.000035	0.0002	0.002	0.0001
10-Nov-10	21	--	--	0.01	--	--	218	--	--	--	--	--	2.3	--	--	--	--	1.1	--	--	--	--	--	--	--	--	--	--	--
17-Nov-10	22	--	--	0.01	--	--	176	--	--	--	--	--	2	--	--	--	--	0.9	--	--	--	--	--	--	--	--	--	--	--
24-Nov-10	23	--	--	0.01	--	--	148	--	--	--	--	--	1.6	--	--	--	--	0.8	--	--	--	--	--	--	--	--	--	--	--
1-Dec-10	24	0.00171	0.00005	0.008	0.000005	0.008	172	1.28	0.012	0.000002	0.00043	0.691	2.08	0.00061	0.00832	1.3	0.000005	1	0.509	0.00002	0.000016	0.000005	0.00233	0.0006	0.00009	0.000026	0.0002	0.001	0.0001
8-Dec-10	25	--	--	0.01	--	--	162	--	--	--	--	--	2.6	--	--	--	--	1.8	--	--	--	--	--	--	--	--	--	--	--
15-Dec-10	26	--	--	0.01	--	--	144	--	--	--	--	--	1.8	--	--	--	--	0.7	--	--	--	--	--	--	--	--	--	--	--
22-Dec-10	27	--	--	0.01	--	--	142	--	--	--	--	--	2.4	--	--	--	--	0.8	--	--	--	--	--	--	--	--	--	--	--
29-Dec-10	28	0.00169	0.00005	0.008	0.000008	0.0068	157	1.28	0.01	0.000002	0.00043	0.637	1.84	0.00058	0.00528	1.4	0.000006	0.88	0.517	0.00002	0.000016	0.000005	0.0026	0.0018	0.00002	0.000026	0.0006	0.001	0.0001
5-Jan-11	29	--	--	0.01	--	--	115	--	--	--	--	--	1.3	--	--	--	--	0.7	--	--	--	--	--	--	--	--	--	--	--
12-Jan-11	30	--	--	0.01	--	--	104	--	--	--	--	--	1.4	--	--	--	--	0.6	--	--	--	--	--	--	--	--	--	--	--
19-Jan-11	31	--	--	0.01	--	--	108	--	--	--	--	--	1.2	--	--	--	--	0.8	--	--	--	--	--	--	--	--	--	--	--
26-Jan-11	32	0.00117	0.00005	0.006	0.000027	0.0055	112	0.874	0.002	0.000003	0.00044	0.401	1.45	0.00048	0.00307	1	0.00001	0.7	0.4	0.00002	0.000018	0.000008	0.00222	0.0005	0.00001	0.000017	0.0002	0.0012	0.0001
2-Feb-11	33	--	--	0.01	--	--	89.1	--	--	--	--	--	1.3	--	--	--	--	0.9	--	--	--	--	--	--	--	--	--	--	--
9-Feb-11	34	--	--	0.01	--	--	95	--	--	--	--	--	1.1	--	--	--	--	0.7	--	--	--	--	--	--	--	--	--	--	--
16-Feb-11	35	--	--	0.01	--	--	87.3	--	--	--	--	--	0.9	--	--	--	--	0.5	--	--	--	--	--	--	--	--	--	--	--
23-Feb-11	36	0.00097	0.00005	0.01	0.000014	0.004	83.9	0.606	0.017	0.000002	0.00034	0.256	1	0.00044	0.00246	1	0.000005	0.57	0.312	0.00002	0.000014	0.000005	0.00173	0.0005	0.00001	0.000033	0.0002	0.0005	0.0001
2-Mar-11	37	--	--	0.01	--	--	86.4	--	--	--	--	--	0.9	--	--	--	--	0.5	--	--	--	--	--	--	--	--	--	--	--
9-Mar-11	38	--	--	0.01	--	--	94.3	--	--	--	--	--	0.9	--	--	--	--	0.6	--	--	--	--	--	--	--	--	--	--	--
16-Mar-11	39	--	--	0.01	--	--	96.9	--	--	--	--	--	0.8	--	--	--	--	0.4	--	--	--	--	--	--	--	--	--	--	--
23-Mar-11	40	0.00086	0.00005	0.007	0.000012	0.0037	92.8	0.404	0.034	0.000002	0.00053	0.172	0.92	0.00032	0.00242	0.9	0.000005	0.64	0.307	0.00002	0.000016	0.000005	0.0018	0.0005	0.00002	0.000027	0.0002	0.0027	0.0001
30-Mar-11	41	--	--	0.01	--	--	90.2	--	--	--	--	--	0.7	--	--	--	--	0.6	--	--	--	--	--	--	--	--	--	--	--
6-Apr-11	42	--	--	0.01	--	--	80.4	--	--	--	--	--	0.8	--	--	--	--	0.7	--	--	--	--	--	--	--	--	--	--	--
13-Apr-11	43	--	--	0.01	--	--	76.8	--	--	--	--	--	0.7	--	--	--	--	0.4	--	--	--	--	--	--	--	--	--	--	--
20-Apr-11	44	0.00102	0.00005	0.004	0.000016	0.0032	82	0.504	0.009	0.000002	0.00039	0.203	0.82	0.00042	0.00195	0.9	0.000005	0.59	0.282	0.00002	0.000015	0.000005	0.00188	0.0005	0.00001	0.000024	0.0002	0.0016	0.0001
27-Apr-11	45	--	--	0.01	--	--	81.5	--	--	--	--	--	0.7	--	--	--	--	0.7	--	--	--	--	--	--	--	--	--	--	--
4-May-11	46	--	--	0.01	--	--	80	--	--	--	--	--	0.8	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--
11-May-11	47	--	--	0.01	--	--	79.6	--	--	--	--	--	0.7	--	--	--	--	0.5	--	--	--	--	--	--	--	--	--	--	--
18-May-11	48	0.00098	0.00005	0.008	0.000009	0.0031	72.9	0.488	0.022	0.000002	0.00037	0.19	0.72	0.00034	0.0018	1	0.000005	0.5	0.28	0.00002	0.000012	0.000005	0.00148	0.0005	0.00001	0.000022	0.0002	0.0006	0.0001
25-May-11	49	--	--	0.01	--	--	78.7	--	--	--	--	--	0.6	--	--	--	--	0.5	--	--	--	--	--	--	--	--	--	--	--
1-Jun-11	50	--	--	0.01	--	--	78.6	--	--	--	--	--	0.6	--	--	--	--	0.5	--	--	--	--	--	--	--	--	--	--	--
8-Jun-11	51	--	--	0.01	--	--	73.1	--	--	--	--	--	0.4	--	--	--	--	0.5	--	--	--	--	--	--	--	--	--	--	--
15-Jun-11	52	0.00105																											

Appendix G: Kinetic Data, Humidity Cell Tests

Naartok West
CND Residue
HC-58 Tailings

Loading Calculations																																	
Sampling Date	Week No.	SO4	Acidity to pH 4.5	Acidity to pH 8.3	Total Alkalinity to pH 4.5	Fluoride	Chloride	Nitrate-N	Nitrite-N	Total Ammonia	Diss.-P	TDS	Total CN	WAD CN	Free CN	SCN	CNO	Hardness CaCO3	Al	Sb	As	Ba	Be	Bi	B	Cs	Cd	Ca	Cr	Co	Cu	La	
		mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	
Detection Limits																																	
16-Jun-10	0	1551.12	--	1.84	40.48	0.1058	119.6	0.0506	0.00828	1.702	0.0023	1840	0.0414	0.0092	0.0092	--	0.046	1219	0.0023	0.002714	0.06486	0.017388	0.000023	0.0000138	0.138	0.000138	0.0000368	217.58	0.00023	0.0552	0.004784	0.000138	
23-Jun-10	1	358.5	--	1.5	31.5	0.055	21	0.01	0.0035	0.355	0.005	600	0.01	0.01	0.01	--	0.05	418.5	0.0013	0.0018	0.0447	0.0055	0.000005	0.0000025	0.025	0.000025	0.000015	114.5	0.00005	0.0302	0.002175	0.000025	
30-Jun-10	2	174.3	--	0.84	22.68	0.021	4.116	0.0084	0.0021	0.2226	0.00336	310.8	0.0168	0.0084	0.0084	5.0022	0.042	217.56	0.00147	0.000819	0.012054	0.0030366	0.0000042	0.0000021	0.021	0.000021	0.00000546	58.8	0.000042	0.027468	0.0015288	0.000021	
7-Jul-10	3	315.35	--	2.55	34	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	76.5	--	--	--	--
14-Jul-10	4	390.24	--	2.4	38.4	0.0384	0.528	0.0096	0.0024	1.536	0.00432	624	0.0096	0.0096	0.0096	1.0608	0.048	450.24	0.000432	0.00096	0.009024	0.00456	0.0000048	0.0000024	0.024	0.000024	0.00001008	87.84	0.000096	0.1128	0.0015312	0.000024	
21-Jul-10	5	1092.6	--	5.4	71.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	187.2	--	--	--	--
28-Jul-10	6	445.91	--	3.44	33.11	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	79.98	--	--	--	--
4-Aug-10	7	866.575	--	5.525	56.525	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	147.475	--	--	--	--
11-Aug-10	8	534	--	3.5	44.5	0.06	0.25	0.01	0.0025	1.3	0.004	900	0.01	0.01	0.01	0.05	0.05	469	0.0005	0.000605	0.00482	0.00474	0.000005	0.0000025	0.025	0.000025	0.0000185	118	0.00015	0.2555	0.00123	0.000025	
18-Aug-10	9	450.12	--	3.96	32.56	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	75.24	--	--	--	--
25-Aug-10	10	475.23	--	3.72	36.27	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	70.68	--	--	--	--
1-Sep-10	11	631.54	--	4.095	40.95	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	88.27	--	--	--	--
8-Sep-10	12	771.3	--	3.15	45	0.054	0.225	0.009	0.00225	1.395	0.00225	1035	0.009	0.009	0.009	0.045	0.045	873	0.00315	0.0003285	0.0034065	0.0038475	0.0000045	0.00000225	0.0225	0.0000225	0.00001485	119.7	0.000225	0.2079	0.001584	0.0000225	
15-Sep-10	13	716.125	--	3.825	42.075	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	103.7	--	--	--	--
22-Sep-10	14	710.355	--	3.915	42.63	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	107.88	--	--	--	--
29-Sep-10	15	669.76	--	3.68	37.72	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	94.3	--	--	--	--
6-Oct-10	16	601.71	--	3.255	42.78	0.0558	0.2325	0.0093	0.005115	1.488	0.0093	883.5	0.0093	0.0093	0.0093	0.0465	0.0465	674.25	0.00186	0.0002325	0.003162	0.0032085	0.00002325	0.00001395	0.1395	0.0001395	0.0000186	105.555	0.0002325	0.121365	0.001116	0.0001395	
13-Oct-10	17	648.83	--	4.095	38.22	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	93.275	--	--	--	--
20-Oct-10	18	646.35	--	2.325	23.715	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	78.585	--	--	--	--
27-Oct-10	19	541.565	--	2.67	33.82	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	85.885	--	--	--	--
3-Nov-10	20	608.4	--	1.8	36	0.0405	0.225	0.009	0.00225	1.395	0.00225	810	--	--	--	0.045	0.045	616.5	0.00081	0.0001845	0.002511	0.0024435	0.0000045	0.00000225	0.0225	0.0000225	0.00001485	98.55	0.000045	0.08055	0.001584	0.0000225	
10-Nov-10	21	642.005	--	2.73	37.765	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.02275	--	--	--	--	--	--	--	--	105.56	--	--	--	--
17-Nov-10	22	497.955	--	2.225	32.485	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	89	--	--	--	--
24-Nov-10	23	463.32	--	1.76	25.96	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	76.56	--	--	--	--
1-Dec-10	24	490.245	--	2.175	31.755	0.03915	0.348	0.0087	0.002175	1.3485	0.00261	696	0.0087	0.0087	0.0087	0.0435	0.0435	556.8	0.0003915	0.0001653	0.0024186	0.00197055	0.00000435	0.000002175	0.02175	0.00002175	0.000009135	99.615	0.000174	0.06351	0.00074385	0.00002175	
8-Dec-10	25	573.3	--	3.15	33.75	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	94.05	--	--	--	--
15-Dec-10	26	546.375	--	2.79	33.48	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	94.395	--	--	--	--
22-Dec-10	27	500.52	--	2.58	33.54	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	89.87	--	--	--	--
29-Dec-10	28	617.5	--	3	37	0.05	0.25	0.01	0.0025	--	0.0025	850	0.01	0.01	0.01	0.05	0.05	655	0.00125	0.000215	0.002895	0.002515	0.000005	0.0000025	0.025	0.000025	0.000016	134	0.0003	0.0675	0.000845	0.000025	

Appendix G: Kinetic Data, Humidity Cell Tests

Naartok West
CND Residue
HC-58 Tailings

Loading Calculations																												
Sampling Date	Week No.	Fe	Pb	Li	Mg	Mn	P	Hg (by CVAF)	Mo	Ni	Re	K	Rb	Se	Si	Ag	Na	Sr	Te	Ti	Th	Sn	Ti	W	U	V	Zn	Zr
		mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
Detection Limits																												
16-Jun-10	0	0.10074	0.0002944	0.0184	163.76	0.29532	0.0368	0.0000506	0.015042	0.26726	--	10.764	0.000138	0.01242	2.07	0.0000414	99.36	0.6348	0.000046	0.0000046	0.0000138	0.0025898	0.00138	0.0001472	0.000184	0.00046	0.002208	0.00023
23-Jun-10	1	0.0185	0.00001	0.00745	32.1	0.172	0.0065	0.00001	0.00575	0.23	--	2.865	0.00005	0.00435	1.8	0.0000035	8.05	0.2575	0.00001	0.000003	0.0000025	0.00188	0.00025	0.00004	0.000083	0.0001	0.00135	0.00005
30-Jun-10	2	0.00336	0.00000714	0.003696	17.094	0.1785	0.00378	0.0000084	0.0016086	0.23688	--	1.4784	0.0000252	0.003423	0.798	0.0000021	1.9698	0.12978	0.0000084	0.00000126	0.0000021	0.0009618	0.00021	0.0000042	0.00002856	0.000084	0.000672	0.000042
7-Jul-10	3	0.00425	--	--	36.55	--	--	--	--	--	--	2.6775	--	--	--	--	2.3375	--	--	--	--	--	--	--	--	--	--	--
14-Jul-10	4	0.00288	0.00000576	0.006528	56.16	0.4848	0.00192	0.0000096	0.0011424	0.8496	--	3.936	0.0001728	0.013392	0.816	0.0000024	2.5296	0.1968	0.0000096	0.00000672	0.0000024	0.0009504	0.00024	0.0000048	0.0000336	0.000096	0.001056	0.000048
21-Jul-10	5	0.0045	--	--	180.9	--	--	--	--	--	--	7.38	--	--	--	--	4.995	--	--	--	--	--	--	--	--	--	--	--
28-Jul-10	6	0.0043	--	--	66.65	--	--	--	--	--	--	2.752	--	--	--	--	1.548	--	--	--	--	--	--	--	--	--	--	--
4-Aug-10	7	0.00425	--	--	146.625	--	--	--	--	--	--	3.995	--	--	--	--	2.2525	--	--	--	--	--	--	--	--	--	--	--
11-Aug-10	8	0.0015	0.0000415	0.00815	87	1.08	0.004	0.00001	0.00057	1.65	--	2.99	0.000195	0.0163	0.6	0.0000025	1.5	0.253	0.00001	0.000008	0.0000025	0.000955	0.00025	0.000005	0.000024	0.0001	0.00255	0.00005
18-Aug-10	9	0.0044	--	--	71.72	--	--	--	--	--	--	1.936	--	--	--	--	0.836	--	--	--	--	--	--	--	--	--	--	--
25-Aug-10	10	0.00465	--	--	78.585	--	--	--	--	--	--	1.8135	--	--	--	--	0.7905	--	--	--	--	--	--	--	--	--	--	--
1-Sep-10	11	0.00455	--	--	107.835	--	--	--	--	--	--	2.2295	--	--	--	--	0.9555	--	--	--	--	--	--	--	--	--	--	--
8-Sep-10	12	0.00675	0.00006345	0.007695	139.95	1.332	0.0045	0.000009	0.0003105	1.1205	--	2.367	0.0002565	0.014625	0.675	0.00000225	1.0665	0.26595	0.000009	0.0000063	0.00000225	0.0010305	0.000225	0.0000045	0.00001395	0.00009	0.00189	0.000045
15-Sep-10	13	0.00425	--	--	125.8	--	--	--	--	--	--	1.955	--	--	--	--	0.765	--	--	--	--	--	--	--	--	--	--	--
22-Sep-10	14	0.00435	--	--	114.84	--	--	--	--	--	--	1.7835	--	--	--	--	0.7395	--	--	--	--	--	--	--	--	--	--	--
29-Sep-10	15	0.0046	--	--	97.98	--	--	--	--	--	--	1.518	--	--	--	--	0.598	--	--	--	--	--	--	--	--	--	--	--
6-Oct-10	16	0.02511	0.00005115	0.00558	100.44	0.8928	0.00465	0.000002325	0.000186	0.65565	--	1.488	0.0002325	0.007998	0.6975	0.00001395	0.651	0.231105	0.0000465	0.0000279	0.00001395	0.0009393	0.001395	0.00002325	0.0000186	0.000465	0.001488	0.0002325
13-Oct-10	17	0.00455	--	--	96.46	--	--	--	--	--	--	1.2285	--	--	--	--	0.5005	--	--	--	--	--	--	--	--	--	--	--
20-Oct-10	18	0.00465	--	--	83.7	--	--	--	--	--	--	0.9765	--	--	--	--	0.4185	--	--	--	--	--	--	--	--	--	--	--
27-Oct-10	19	0.00445	--	--	85.44	--	--	--	--	--	--	1.0235	--	--	--	--	0.445	--	--	--	--	--	--	--	--	--	--	--
3-Nov-10	20	0.00405	0.0000657	0.00423	90	0.684	0.0027	0.00000315	0.0001575	0.3933	--	1.1115	0.000189	0.00531	0.54	0.00000495	0.4905	0.23175	0.000009	0.00000855	0.00000315	0.001152	0.000225	0.0000045	0.00001575	0.00009	0.0009	0.000045
10-Nov-10	21	0.00455	--	--	99.19	--	--	--	--	--	--	1.0465	--	--	--	--	0.5005	--	--	--	--	--	--	--	--	--	--	--
17-Nov-10	22	0.00445	--	--	78.32	--	--	--	--	--	--	0.89	--	--	--	--	0.4005	--	--	--	--	--	--	--	--	--	--	--
24-Nov-10	23	0.0044	--	--	65.12	--	--	--	--	--	--	0.704	--	--	--	--	0.352	--	--	--	--	--	--	--	--	--	--	--
1-Dec-10	24	0.00348	0.000002175	0.00348	74.82	0.5568	0.00522	0.00000087	0.00018705	0.300585	--	0.9048	0.00026535	0.0036192	0.5655	0.000002175	0.435	0.221415	0.0000087	0.00000696	0.000002175	0.00101355	0.000261	0.00003915	0.00001131	0.000087	0.000435	0.0000435
8-Dec-10	25	0.0045	--	--	72.9	--	--	--	--	--	--	1.17	--	--	--	--	0.81	--	--	--	--	--	--	--	--	--	--	--
15-Dec-10	26	0.00465	--	--	66.96	--	--	--	--	--	--	0.837	--	--	--	--	0.3255	--	--	--	--	--	--	--	--	--	--	--
22-Dec-10	27	0.0043	--	--	61.06	--	--	--	--	--	--	1.032	--	--	--	--	0.344	--	--	--	--	--	--	--	--	--	--	--
29-Dec-10	28	0.004	0.000004	0.0034	78.5	0.64	0.005	0.000001	0.000215	0.3185	--	0.92	0.00029	0.00264	0.7	0.000003	0.44	0.2585	0.00001	0.000008	0.0000025	0.0013	0.0009	0.00001	0.000013	0.0003	0.0005	0.00005
5-Jan-11	29	0.00445	--	--	51.175	--	--	--	--	--	--	0.5785	--	--	--	--	0.3115	--	--	--	--	--	--	--	--	--	--	--
12-Jan-11	30	0.0046	--	--	47.84	--	--	--	--	--	--	0.644	--	--	--	--	0.276	--	--	--	--	--	--	--	--	--	--	--
19-Jan-11	31	0.0044	--	--	47.52	--	--	--	--	--	--	0.528	--	--	--	--	0.352	--	--	--	--	--	--	--	--	--	--	--
26-Jan-11	32	0.00273	0.000012285	0.0025025	50.96	0.39767	0.00091	0.000001365	0.0002002	0.182455	--	0.65975	0.0002184	0.00139685	0.455	0.00000455	0.3185	0.182	0.0000091	0.00000819	0.00000364	0.0010101	0.0002275	0.00000455	0.000007735	0.000091	0.000546	0.0000455
2-Feb-11	33	0.0042	--	--	37.422	--	--																					

Appendix G: Kinetic Data, Humidity Cell Tests

Naartok West
HC-59 Mixed Tailings

Concentrations																																					
Sampling Date	Week No.	Input Vol. ml	Output Vol. ml	pH	EC	ORP	SO4	Acidity to pH 4.5	Acidity to pH 8.3	Alkalinity	Fluoride	Chloride	Nitrate-N	Nitrite-N	Total Ammonia	Diss.-P	TDS	Total CN	WAD CN	Free CN	SCN	CNO	Hardness CaCO3	Al	Sb	As	Ba	Be	Bi	B	Cs	Cd	Ca	Cr	Co		
		ml	ml	pH Units	µS/cm	mV	mg/L	mg CaCO3/L	mg CaCO3/L	mg CaCO3/L	mg/L	mg/L	mg/L	mg/L	mgN/L	mgP/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	
Detection Limits		5	5	0.01	1.0	50	1.0	1.0	1.0	1.0	0.1	0.2	0.02	0.002	0.01	0.001	10	0.02	0.02	0.02	0.1	0.1	Calculation	0.05	0.0001	0.0002	0.0002	0.0001	0.0001	--	0.005	0.0001	0.00001	0.01	0.05	0.0002	0.0001
16-Jun-10	0	750	415	8.32	771	100	352	--	--	114	0.29	32	0.1	0.221	0.87	0.008	610	0.79	0.07	0.02	2.7	0.1	272	0.0403	0.0253	0.873	0.028	0.00001	0.000005	0.25	0.00005	0.000038	38.5	0.0085	0.0558		
23-Jun-10	1	500	495	8.3	558	110	191	--	--	159	0.23	2.9	0.02	0.006	0.46	0.082	430	0.48	0.02	0.02	0.1	0.1	307	0.025	0.0247	0.971	0.0411	0.00005	0.00003	0.3	0.0003	0.00003	53.1	0.0005	0.0194		
30-Jun-10	2	500	425	8.12	250	135	69	--	1	47	0.06	0.5	0.02	0.005	0.05	0.101	140	0.04	0.02	0.02	0.1	0.1	111	0.0242	0.00697	0.295	0.0124	0.00001	0.000005	0.05	0.00005	0.000005	23.2	0.0002	0.00397		
7-Jul-10	3	500	470	7.9	471	145	203	--	--	58	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
14-Jul-10	4	500	465	7.87	409	145	294	--	1	53	0.08	0.5	0.02	0.005	0.05	0.008	480	0.02	0.02	0.02	1.1	0.1	353	0.0203	0.00482	0.106	0.0156	0.00001	0.000005	0.05	0.00005	0.000005	76.7	0.0001	0.0109		
21-Jul-10	5	500	425	8.07	1751	120	1034	--	2	97	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
28-Jul-10	6	500	445	7.95	542	150	267	--	2	62	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
4-Aug-10	7	500	470	8.06	831	130	472	--	2	88	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
11-Aug-10	8	500	460	8.05	512	145	209	--	2	69	0.08	0.5	0.02	0.005	0.05	0.007	390	0.02	0.02	0.02	0.1	0.1	353	0.0226	0.00397	0.0615	0.0127	0.00001	0.000005	0.05	0.00005	0.000005	64	0.0003	0.00812		
18-Aug-10	9	500	450	7.96	448	150	201	--	2	58	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
25-Aug-10	10	500	475	7.96	438	150	189	--	2	52	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
1-Sep-10	11	500	430	7.95	665	170	356	--	2	65	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
8-Sep-10	12	500	450	7.87	570	140	283	--	1	57	0.09	0.5	0.02	0.005	0.05	0.008	510	0.02	0.02	0.02	0.1	0.1	329	0.0195	0.00227	0.0323	0.0112	0.00001	0.000005	0.05	0.00005	0.000005	73	0.0004	0.00791		
15-Sep-10	13	500	460	8	574	145	295	--	2	62	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
22-Sep-10	14	500	480	8.01	601	130	262	--	2	87	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
29-Sep-10	15	500	460	7.95	409	135	186	--	2	62	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
6-Oct-10	16	500	460	8	513	140	243	--	2	66	0.05	0.5	0.02	0.006	0.022	0.028	390	0.03	0.02	0.02	0.1	0.1	308	0.0332	0.00215	0.03	0.0143	0.00001	0.000005	0.05	0.00005	0.000008	67.5	0.0004	0.00647		
13-Oct-10	17	500	445	7.96	521	140	208	--	2	58	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
20-Oct-10	18	500	475	7.91	517	145	217	--	2	55	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
27-Oct-10	19	500	490	8.1	581	145	209	--	2	79	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
3-Nov-10	20	500	455	7.92	575	135	134	--	2	54	0.05	0.5	0.02	0.005	0.19	0.008	240	--	--	--	0.1	0.1	170	0.0215	0.00149	0.0275	0.00899	0.00001	0.000005	0.05	0.00005	0.000007	35.1	0.0001	0.00305		
10-Nov-10	21	500	430	7.85	453	140	177	--	2	55	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
17-Nov-10	22	500	485	8.06	535	145	182	--	1	64	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
24-Nov-10	23	500	450	7.98	384	145	125	--	1	59	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
1-Dec-10	24	500	475	8.02	338	135	139	--	1	66	0.04	0.5	0.02	0.005	0.05	0.008	170	0.03	0.02	0.02	0.1	0.1	201	0.0198	0.00184	0.0304	0.0131	0.00001	0.000005	0.05	0.00005	0.000008	40.1	0.0002	0.00311		
8-Dec-10	25	500	455	8.07	405	130	135	--	1	66	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
15-Dec-10	26	500	425	8.06	387	130	118	--	1	67	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
22-Dec-10	27	500	430	8.07	389	125	104	--	1	73	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
29-Dec-10	28	500	450	8.05	372	140	105																														

Appendix G: Kinetic Data, Humidity Cell Tests

HC-59 Naartok West
Mixed Tailings

		Concentrations																												
Sampling Date	Week No.	Cu	La	Fe	Pb	Li	Mg	Mn	P	Hg	Mo	Ni	K	Rb	Se	Si	Ag	Na	Sr	Te	Tl	Th	Sn	Ti	W	U	V	Zn	Zr	
		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Detection Limits		0.001	0.001	0.01	0.0005	0.001	0.005	0.001	0.015	0.000002	0.001	0.0002	0.01	0.0001	0.0002	0.05	0.00004	0.005	0.0001	0.0002	0.00002	0.00005	0.0001	0.0002	0.0001	0.00005	0.0001	0.0001	0.0001	0.0001
		0.02	--	0.01	0.03	--	0.05	0.003	0.15	--	0.02	0.02	0.25	--	--	--	0.01	0.1	0.001	--	--	--	0.03	0.005	--	--	--	0.01	0.005	0.02
16-Jun-10	0	0.00439	0.00005	0.531	0.000207	0.0114	42.6	0.0291	0.158	0.00003	0.0802	0.0271	35.8	0.00158	0.00493	4.3	0.000104	57	0.248	0.00002	0.000017	0.000005	0.00815	0.0005	0.00489	0.000242	0.0016	0.007	0.0001	
23-Jun-10	1	0.0034	0.0003	0.333	0.00004	0.013	42.4	0.0492	0.00002	0.0195	0.0985	0.025	24.6	0.0011	0.0025	11.7	0.00004	11.8	0.242	0.0001	0.00001	0.00003	0.00896	0.003	0.00261	0.00028	0.002	0.0023	0.0005	
30-Jun-10	2	0.00093	0.00005	0.024	0.000023	0.0041	12.8	0.0331	0.01	0.00002	0.00238	0.0335	7.4	0.00052	0.0011	2.5	0.000005	1.55	0.087	0.00002	0.000003	0.000005	0.00388	0.0005	0.00048	0.000066	0.0003	0.0003	0.0001	
7-Jul-10	3	--	--	0.02	--	--	30.3	--	--	--	--	--	10.5	--	--	--	--	1.9	--	--	--	--	--	--	--	--	--	--	--	--
14-Jul-10	4	0.00055	0.00005	0.026	0.000012	0.0069	39.2	0.105	0.003	0.00002	0.00369	0.0968	12.1	0.00109	0.00425	2.9	0.000005	2.19	0.218	0.00002	0.000004	0.000005	0.0032	0.0005	0.00017	0.000179	0.0002	0.0004	0.0001	
21-Jul-10	5	--	--	0.04	--	--	141	--	--	--	--	--	32.2	--	--	--	--	5.8	--	--	--	--	--	--	--	--	--	--	--	--
28-Jul-10	6	--	--	0.02	--	--	37.5	--	--	--	--	--	12	--	--	--	--	1.7	--	--	--	--	--	--	--	--	--	--	--	--
4-Aug-10	7	--	--	0.03	--	--	62.2	--	--	--	--	--	16.8	--	--	--	--	2.4	--	--	--	--	--	--	--	--	--	--	--	--
11-Aug-10	8	0.00108	0.00005	0.028	0.000047	0.0072	31.5	0.0876	0.002	0.00002	0.00463	0.0464	10.6	0.0012	0.00292	2.3	0.000005	1.4	0.165	0.00002	0.000004	0.000005	0.00589	0.0005	0.00017	0.00014	0.0002	0.0008	0.0001	
18-Aug-10	9	--	--	0.02	--	--	27.2	--	--	--	--	--	8.1	--	--	--	--	0.9	--	--	--	--	--	--	--	--	--	--	--	--
25-Aug-10	10	--	--	0.01	--	--	26.9	--	--	--	--	--	7.8	--	--	--	--	0.9	--	--	--	--	--	--	--	--	--	--	--	--
1-Sep-10	11	--	--	0.01	--	--	45.9	--	--	--	--	--	10.5	--	--	--	--	1.3	--	--	--	--	--	--	--	--	--	--	--	--
8-Sep-10	12	0.0017	0.00005	0.025	0.000049	0.0061	35.7	0.101	0.003	0.00002	0.00394	0.0353	8.59	0.00124	0.0027	2.3	0.000005	1.12	0.16	0.00002	0.000005	0.000005	0.00413	0.0005	0.0001	0.000112	0.0002	0.0008	0.0001	
15-Sep-10	13	--	--	0.01	--	--	38.5	--	--	--	--	--	8.7	--	--	--	--	1.1	--	--	--	--	--	--	--	--	--	--	--	--
22-Sep-10	14	--	--	0.01	--	--	40.8	--	--	--	--	--	9.5	--	--	--	--	1.2	--	--	--	--	--	--	--	--	--	--	--	--
29-Sep-10	15	--	--	0.01	--	--	25.5	--	--	--	--	--	6.4	--	--	--	--	0.8	--	--	--	--	--	--	--	--	--	--	--	--
6-Oct-10	16	0.0017	0.00005	0.084	0.00006	0.0059	33.9	0.0904	0.012	0.000006	0.00426	0.027	7.34	0.00158	0.00146	2.5	0.000005	0.95	0.148	0.00002	0.000007	0.000005	0.00419	0.0012	0.00017	0.000114	0.0002	0.0015	0.0001	
13-Oct-10	17	--	--	0.01	--	--	26.7	--	--	--	--	--	5.6	--	--	--	--	0.7	--	--	--	--	--	--	--	--	--	--	--	--
20-Oct-10	18	--	--	0.01	--	--	27.1	--	--	--	--	--	5.7	--	--	--	--	0.7	--	--	--	--	--	--	--	--	--	--	--	--
27-Oct-10	19	--	--	0.01	--	--	35.5	--	--	--	--	--	6.9	--	--	--	--	0.9	--	--	--	--	--	--	--	--	--	--	--	--
3-Nov-10	20	0.00106	0.00005	0.017	0.000027	0.0037	20	0.0514	0.003	0.00001	0.00325	0.0119	4.44	0.00097	0.0007	1.6	0.000005	0.6	0.0823	0.00002	0.000005	0.000005	0.00374	0.0005	0.00011	0.000058	0.0002	0.0008	0.0001	
10-Nov-10	21	--	--	0.02	--	--	27.3	--	--	--	--	--	5.2	--	--	--	--	0.7	--	--	--	--	--	--	--	--	--	--	--	--
17-Nov-10	22	--	--	0.03	--	--	31.7	--	--	--	--	--	6	--	--	--	--	0.8	--	--	--	--	--	--	--	--	--	--	--	--
24-Nov-10	23	--	--	0.02	--	--	21.4	--	--	--	--	--	4.5	--	--	--	--	0.6	--	--	--	--	--	--	--	--	--	--	--	--
1-Dec-10	24	0.00055	0.00005	0.03	0.000008	0.0042	24.4	0.057	0.006	0.000002	0.00525	0.0114	4.9	0.00138	0.00093	2.1	0.000005	0.71	0.0979	0.00002	0.000006	0.000005	0.00502	0.0005	0.0002	0.000055	0.0002	0.0005	0.0001	
8-Dec-10	25	--	--	0.03	--	--	23.6	--	--	--	--	--	4.9	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--
15-Dec-10	26	--	--	0.03	--	--	21.4	--	--	--	--	--	4.4	--	--	--	--	0.5	--	--	--	--	--	--	--	--	--	--	--	--
22-Dec-10	27	--	--	0.04	--	--	22.9	--	--	--	--	--	4.7	--	--	--	--	0.6	--	--	--	--	--	--	--	--	--	--	--	--
29-Dec-10	28	0.00052	0.00005	0.047	0.000044	0.0039	21.5	0.0359	0.005	0.000002	0.00672	0.00735	4.98	0.00156	0.00078	2.2	0.000006	0.7	0.0796	0.00002	0.000005	0.000005	0.00585	0.0005	0.00029	0.000058	0.0003	0.0008	0.0001	
5-Jan-11	29	--	--	0.04	--	--	22.5	--	--	--	--	--	4.5	--	--	--	--	0.7	--	--	--	--	--	--	--	--	--	--	--	--
12-Jan-11	30	--	--	0.06	--	--	21	--	--	--	--	--	4.3	--	--	--	--	0.6	--	--	--	--	--	--	--	--	--	--	--	--
19-Jan-11	31	--	--	0.05	--	--	20.9	--	--	--	--	--	4.2	--	--	--	--	0.7	--	--	--	--	--	--	--	--	--	--	--	--
26-Jan-11	32	0.0004	0.00005	0.087	0.000012	0.0039	21.5	0.0297	0.002	0.000002	0.00607	0.00649	4.5	0.00176	0.00062	2.4	0.000007	0.66	0.0788	0.00002	0.000006	0.000005	0.00535	0.0005	0.00036	0.00005	0.0002	0.0004	0.0001	
2-Feb-11	33	--	--	0.06	--	--	21	--	--	--	--	--	4.7	--	--	--	--	1.3	--	--	--	--	--	--	--	--	--	--	--	--
9-Feb-11	34	--	--	0.06	--	--	20.9	--	--	--	--	--	3.6	--	--	--	--	0.6	--	--	--	--	--	--	--	--	--	--	--	--
16-Feb-11	35	--	--	0.05	--	--	20.1	--	--	--	--	--	3.1	--	--	--	--	0.4	--	--	--	--	--	--	--	--	--	--	--	--
23-Feb-11	36	0.00055	0.00005	0.133	0.000032	0.0037	25	0.0317	0.019	0.000002	0.00564	0.00627	4.11	0.00207	0.00037	2.3	0.000005	0.62	0.0777	0.00002	0.000005	0.000005	0.0045	0.0005	0.00023	0.000056	0.0002	0.0002	0.0001	
2-Mar-11	37	--	--	0.06	--	--	22.5	--	--	--	--	--	3.2	--	--	--	--	0.4	--	--	--	--	--	--	--	--	--	--	--	--
9-Mar-11	38	--	--	0.13	--	--	30.3	--	--	--	--	--	4.2	--	--	--	--	0.6	--	--	--	--	--	--	--	--	--	--	--	--
16-Mar-11	39	--	--	0.1	--	--	31.7	--	--	--	--	--	4	--	--	--	--	0.4	--	--	--	--	--	--	--	--	--	--	--	--
23-Mar-11	40	0.00035	0.00005	0.215	0.000028	0.0038	36.8	0.0246	0.02	0.000002	0.00764	0.00664	4.97	0.00214	0.00034	2.2	0.000005	0.71	0.0848	0.00002	0.000004	0.000005	0.00409	0.0005	0.00016	0.000053	0.0002	0.0014	0.0001	
30-Mar-11	41	--	--	0.08	--	--	34.7	--	--	--	--	--	4.7	--	--	--	--	0.6	--	--	--	--	--	--	--	--	--	--	--	--
6-Apr-11	42	--	--	0.17	--	--	41.7	--	--	--	--	--	5	--	--	--	--	0.8	--	--	--	--	--	--	--	--	--	--	--	--
13-Apr-11	43	--	--	0.21	--	--	34.6	--	--	--	--	--	4.2	--	--	--	--	0.4	--	--	--	--	--	--	--	--	--	--	--	--
20-Apr-11	44	0.00041	0.00005	0.245	0.000035	0.0037	40.4	0.027	0.011	0.000002	0.0129	0.00686	4.93	0.0027	0.00024	1.9	0.000008	0.65	0.0716	0.00002	0.000007	0.000005	0.00523	0.0005	0.00016	0.000055	0.0002	0.0015	0.0001	
27-Apr-11	45	--	--	0.27	--	--	42.8	--	--	--	--	--	4.8	--	--	--	--	0.7	--	--	--	--	--	--	--	--	--	--	--	--
4-May-11	46	--	--	0.26	--	--	42.4	--	--	--	--	--	4.7	--	--	--	--	0.9	--	--	--	--	--	--	--	--	--	--	--	--
11-May-11	47	--	--	0.27	--	--	41.7	--	--	--	--	--	4.5	--	--	--	--	0.5	--	--	--	--	--	--	--	--	--	--	--	--
18-May-11	48	0.00026	0.00005	0.3	0.00001	0.0036	37.3	0.0185	0.017	0.000002	0.0119	0.00527	4.27	0.00266	0.00025	2	0.000005	0.52	0.0527	0.00002	0.000007	0.000005	0.00484	0.0005	0.00013	0.000031	0.0002	0.0003	0.0001	
25-May-11	49	--	--	0.3	--	--	42.5	--	--	--	--	--	4.5	--	--	--	--	0.5	--	--	--	--	--	--	--	--	--	--	--	--
1-Jun-11	50	--	--	0.28	--	--	45.3	--	--	--	--	--	4.9	--</																

Appendix G: Kinetic Data, Humidity Cell Tests

HC-59	Naartok West Mixed Tailings
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		Loading Calculations																													
Sampling Date	Week No.	SO4	Acidity to pH 4.5	Acidity to pH 8.3	Alkalinity to pH 4.5	Fluoride	Chloride	Nitrate-N	Nitrite-N	Total Ammonia	Diss.-P	TDS	Total CN	WAD CN	Free CN	SCN	CNO	Hardness CaCO3	Al	Sb	As	Ba	Be	Bi	B	Cs	Cd	Ca	Cr	Co	
		mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	
Detection Limits																															
16-Jun-10	0	146.08	--	--	47.31	0.12035	13.28	0.0415	0.091715	0.36105	0.00332	253.15	0.32785	0.02905	0.0083	1.11635	0.0415	112.88	0.0167245	0.0104995	0.362295	0.01162	0.00000415	0.000002075	0.10375	0.00002075	0.00001577	15.9775	0.0035275	0.023157	
23-Jun-10	1	94.545	--	--	78.705	0.11385	1.4355	0.0099	0.00297	0.2277	0.04059	212.85	0.2376	0.0099	0.0099	0.0495	0.0495	151.965	0.012375	0.0122265	0.480645	0.0203445	0.00002475	0.00001485	0.1485	0.0001485	0.00001485	26.2845	0.0002475	0.009603	
30-Jun-10	2	29.325	--	0.425	19.975	0.0255	0.2125	0.0085	0.002125	0.02125	0.042925	59.5	0.017	0.0085	0.0085	0.0425	0.0425	47.175	0.010285	0.00296225	0.125375	0.00527	0.00000425	0.000002125	0.02125	0.00002125	0.000002125	9.86	0.000085	0.00168725	
7-Jul-10	3	95.41	--	0.47	27.26	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	25.239	--	--
14-Jul-10	4	136.71	--	0.465	24.645	0.0372	0.2325	0.0093	0.002325	0.02325	0.00372	223.2	0.0093	0.0093	0.0093	0.52545	0.0465	164.145	0.0094395	0.0022413	0.04929	0.007254	0.00000465	0.000002325	0.02325	0.00002325	0.000002325	35.6655	0.0000465	0.0050685	
21-Jul-10	5	439.45	--	0.85	41.225	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	99.025	--	--
28-Jul-10	6	118.815	--	0.89	27.59	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	30.794	--	--
4-Aug-10	7	221.84	--	0.94	41.36	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	54.52	--	--
11-Aug-10	8	96.14	--	0.92	31.74	0.0368	0.23	0.0092	0.0023	0.023	0.00322	179.4	0.0092	0.0092	0.0092	0.046	0.046	162.38	0.010396	0.0018262	0.02829	0.005842	0.0000046	0.0000023	0.023	0.000023	0.0000023	29.44	0.000138	0.0037352	
18-Aug-10	9	90.45	--	0.9	26.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	25.2	--	--
25-Aug-10	10	89.775	--	0.95	24.7	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	25.7925	--	--
1-Sep-10	11	153.08	--	0.86	27.95	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	39.646	--	--
8-Sep-10	12	127.35	--	0.45	25.65	0.0405	0.225	0.009	0.00225	0.0225	0.0036	229.5	0.009	0.009	0.009	0.045	0.045	148.05	0.008775	0.0010215	0.014535	0.00504	0.0000045	0.00000225	0.0225	0.0000225	0.00000225	32.85	0.00018	0.0035595	
15-Sep-10	13	135.7	--	0.92	28.52	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	34.362	--	--
22-Sep-10	14	125.76	--	0.96	41.76	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	36.048	--	--
29-Sep-10	15	85.56	--	0.92	28.52	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	23.046	--	--
6-Oct-10	16	111.78	--	0.92	30.36	0.023	0.23	0.0092	0.00276	0.01012	0.01288	179.4	0.0138	0.0092	0.0092	0.046	0.046	141.68	0.015272	0.000989	0.0138	0.006578	0.0000046	0.0000023	0.023	0.000023	0.00000368	31.05	0.000184	0.0029762	
13-Oct-10	17	92.56	--	0.89	25.81	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	22.7395	--	--
20-Oct-10	18	103.075	--	0.95	26.125	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	23.465	--	--
27-Oct-10	19	102.41	--	0.98	38.71	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	30.478	--	--
3-Nov-10	20	60.97	--	0.91	24.57	0.02275	0.2275	0.0091	0.002275	0.08645	0.00364	109.2	--	--	--	0.0455	0.0455	77.35	0.0097825	0.00067795	0.0125125	0.00409045	0.00000455	0.000002275	0.02275	0.00002275	0.000003185	15.9705	0.0000455	0.00138775	
10-Nov-10	21	76.11	--	0.86	23.65	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	19.866	--	--
17-Nov-10	22	88.27	--	0.485	31.04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	25.026	--	--
24-Nov-10	23	56.25	--	0.45	26.55	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	15.435	--	--
1-Dec-10	24	66.025	--	0.475	31.35	0.019	0.2375	0.0095	0.002375	0.02375	0.0038	80.75	0.01425	0.0095	0.0095	0.0475	0.0475	95.475	0.009405	0.000874	0.01444	0.0062225	0.00000475	0.000002375	0.02375	0.00002375	0.0000038	19.0475	0.000095	0.00147725	
8-Dec-10	25	61.425	--	0.455	30.03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	15.925	--	--
15-Dec-10	26	50.15	--	0.425	28.475	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	13.5575	--	--
22-Dec-10	27	44.72	--	0.43	31.39	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	14.018	--	--
29-Dec-10	28	47.25	--	0.9	32.4	0.036	0.225	0.009	0.00225	0.0225	0.00405	85.5	0.027	0.009	0.009	0.045	0.045	72.9	0.00963	0.000918	0.017775	0.006975	0.0000045	0.00000225	0.0225	0.0000225	0.00000225	13.365	0.000135	0.0009675	
5-Jan-11	29	50.49	--	0.495	40.59	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	14.85	--	--
12-Jan-11	30	33	--	0.44	36.52	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	11.924	--	--
19-Jan-11	31	34.58	--	0.455	38.675	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	12.3305	--	--
26-Jan-11	32	32.76	--	0.455	40.95	0.0364	0.273	0.0091	0.002275	0.00455	0.008645	86.45	0.06825	0.0091	0.0091	0.0455	0.0455	70.07	0.010647	0.001092	0.0232505	0.0106015	0.00000455	0.000002275	0.02275	0.00002275	0.00000364	11.921	0.000182	0.0008463	
2-Feb-11	33	31.15	--	0.445	40.495	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	11.036	--	--
9-Feb-11	34	33.725	--	0.475	43.225	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	11.7325	--	--
16-Feb-11	35	27.09	--	0.43	36.98	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	9.976	--	--
23-Feb-11	36	36.045	--	0.445	41.385	0.02225	0.712	0.0089	0.002225	0.01691	0.009345	89	0.07565	0.0089	0.0089	0.0445	0.0445	74.76	0.0087665	0.00081435	0.0184675	0.0108135	0.00000445	0.000002225	0.02225	0.00002225	0.000002225	11.7035	0.0001335	0.00085885	
2-Mar-11	37	33.48	--	0.465	36.27	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	11.5785	--	--
9-Mar-11	38	59.5	--	0.425	39.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	12.75	--	--
16-Mar-11	39	60.45	--	0.465	41.85	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	14.322	--	--
23-Mar-11	40	60.03	--	0.87	42.195	0.0087	0.2175	0.01305	0.002175	0.01914	0.010005	113.1	0.05655	0.0087	0.0087	0.0435	0.0435	102.66	0.0092655	0.0007134	0.0154425	0.011223	0.00000435	0.000002175	0.02175	0.00002175	0.000002175	14.7465	0.000174	0.0010266	
30-Mar-11	41	56.525	--	0.425	40.8	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	13.0475	--	--
6-Apr-11	42	63.75	--	0.425	46.325	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	14.6625	--	--
13-Apr-11	43	57	--	0.475	47.025	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	13.4425	--	--
20-Apr-11	44	60.9	--	0.87	46.545	0.00435	0.2175	0.0087	0.002175	0.07395	0.003915	117.45	0.0087	0.0087	0.0087	0.0435	0.0435	104.835	0.0095265	0.00057855	0.0116145	0.0095265	0.00000435	0.000002175	0.02175	0.00002175	0.00000522	13.05	0.0003045	0.0010875	
27-Apr-11	45	61.6	--	0.44	48.84	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	13.552	--	--
4-May-11	46	57.85	--	0.445	49.84	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	12.46	--	--
11-May-11	47	54.6	--	0.455	50.96	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	12.1485	--	--
18-May-11	48	60.45	--	--	50.22	0.00465	0.2325	0.0093	0.002325	0.07905	0.																				

Appendix G: Kinetic Data, Humidity Cell Tests

Naartok West
HC-59 Mixed Tailings

Loading Calculations																														
Sampling Date	Week No.	Cu	La	Fe	Pb	Li	Mg	Mn	P	Hg (by CVAF)	Mo	Ni	Re	K	Rb	Se	Si	Ag	Na	Sr	Te	Tl	Th	Sn	Ti	W	U	V	Zn	Zr
		mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
Detection Limits																														
16-Jun-10	0	0.00182185	0.00002075	0.220365	0.000085905	0.004731	17.679	0.0120765	0.06557	0.00001245	0.033283	0.0112465	--	14.857	0.0006557	0.00204595	1.7845	0.00004316	23.655	0.10292	0.0000083	0.000007055	2.08E-06	0.003382	0.000208	0.002029	0.0001	0.000664	0.002905	4.15E-05
23-Jun-10	1	0.001683	0.0001485	0.164835	0.0000198	0.006435	20.988	0.024354	0.0099	0.0000099	0.0096525	0.0487575	--	12.177	0.0005445	0.0012375	5.7915	0.0000198	5.841	0.11979	0.0000495	0.00000495	1.49E-05	0.004435	0.001485	0.001292	0.000139	0.00099	0.001139	0.000248
30-Jun-10	2	0.00039525	0.00002125	0.0102	0.000009775	0.0017425	5.44	0.0140675	0.00425	0.0000085	0.0010115	0.0142375	--	3.145	0.000221	0.0004675	1.0625	0.000002125	0.65875	0.036975	0.0000085	0.000001275	2.13E-06	0.001649	0.000213	0.000204	2.81E-05	0.000128	0.000128	4.25E-05
7-Jul-10	3	--	--	0.0094	--	--	14.241	--	--	--	--	--	--	4.935	--	--	--	--	0.893	--	--	--	--	--	--	--	--	--	--	--
14-Jul-10	4	0.00025575	0.00002325	0.01209	0.00000558	0.0032085	18.228	0.048825	0.001395	0.0000093	0.00171585	0.045012	--	5.6265	0.00050685	0.00197625	1.3485	0.000002325	1.01835	0.10137	0.0000093	0.00000186	2.33E-06	0.001488	0.000233	7.91E-05	8.32E-05	0.000093	0.000186	4.65E-05
21-Jul-10	5	--	--	0.017	--	--	59.925	--	--	--	--	--	--	13.685	--	--	--	--	2.465	--	--	--	--	--	--	--	--	--	--	--
28-Jul-10	6	--	--	0.0089	--	--	16.6875	--	--	--	--	--	--	5.34	--	--	--	--	0.7565	--	--	--	--	--	--	--	--	--	--	--
4-Aug-10	7	--	--	0.0141	--	--	29.234	--	--	--	--	--	--	7.896	--	--	--	--	1.128	--	--	--	--	--	--	--	--	--	--	--
11-Aug-10	8	0.0004968	0.000023	0.01288	0.00002162	0.003312	14.49	0.040296	0.00092	0.0000092	0.0021298	0.021344	--	4.876	0.000552	0.0013432	1.058	0.0000023	0.644	0.0759	0.0000092	0.00000184	2.3E-06	0.002709	0.00023	7.82E-05	6.44E-05	0.000092	0.000368	0.000046
18-Aug-10	9	--	--	0.009	--	--	12.24	--	--	--	--	--	--	3.645	--	--	--	--	0.405	--	--	--	--	--	--	--	--	--	--	--
25-Aug-10	10	--	--	0.00475	--	--	12.7775	--	--	--	--	--	--	3.705	--	--	--	--	0.4275	--	--	--	--	--	--	--	--	--	--	--
1-Sep-10	11	--	--	0.0043	--	--	19.737	--	--	--	--	--	--	4.515	--	--	--	--	0.559	--	--	--	--	--	--	--	--	--	--	--
8-Sep-10	12	0.000765	0.0000225	0.01125	0.00002205	0.002745	16.065	0.04545	0.00135	0.000009	0.001773	0.015885	--	3.8655	0.000558	0.001215	1.035	0.00000225	0.504	0.072	0.000009	0.00000225	2.25E-06	0.001859	0.000225	0.000045	5.04E-05	0.00009	0.00036	0.000045
15-Sep-10	13	--	--	0.0046	--	--	17.71	--	--	--	--	--	--	4.002	--	--	--	--	0.506	--	--	--	--	--	--	--	--	--	--	--
22-Sep-10	14	--	--	0.0048	--	--	19.584	--	--	--	--	--	--	4.56	--	--	--	--	0.576	--	--	--	--	--	--	--	--	--	--	--
29-Sep-10	15	--	--	0.0046	--	--	11.73	--	--	--	--	--	--	2.944	--	--	--	--	0.368	--	--	--	--	--	--	--	--	--	--	--
6-Oct-10	16	0.000782	0.000023	0.03864	0.0000276	0.002714	15.594	0.041584	0.00552	0.00000276	0.0019596	0.01242	--	3.3764	0.0007268	0.0006716	1.15	0.0000023	0.437	0.06808	0.0000092	0.00000322	2.3E-06	0.001927	0.000552	7.82E-05	5.24E-05	0.000092	0.00069	0.000046
13-Oct-10	17	--	--	0.00445	--	--	11.8815	--	--	--	--	--	--	2.492	--	--	--	--	0.3115	--	--	--	--	--	--	--	--	--	--	--
20-Oct-10	18	--	--	0.00475	--	--	12.8725	--	--	--	--	--	--	2.7075	--	--	--	--	0.3325	--	--	--	--	--	--	--	--	--	--	--
27-Oct-10	19	--	--	0.0049	--	--	17.395	--	--	--	--	--	--	3.381	--	--	--	--	0.441	--	--	--	--	--	--	--	--	--	--	--
3-Nov-10	20	0.0004823	0.00002275	0.007735	0.000012285	0.0016835	9.1	0.023387	0.001365	0.00000455	0.00147875	0.0054145	--	2.0202	0.00044135	0.0003185	0.728	0.000002275	0.273	0.0374465	0.0000091	0.000002275	2.28E-06	0.001702	0.000228	5.01E-05	2.64E-05	0.000091	0.000364	4.55E-05
10-Nov-10	21	--	--	0.0086	--	--	11.739	--	--	--	--	--	--	2.236	--	--	--	--	0.301	--	--	--	--	--	--	--	--	--	--	--
17-Nov-10	22	--	--	0.01455	--	--	15.3745	--	--	--	--	--	--	2.91	--	--	--	--	0.388	--	--	--	--	--	--	--	--	--	--	--
24-Nov-10	23	--	--	0.009	--	--	9.63	--	--	--	--	--	--	2.025	--	--	--	--	0.27	--	--	--	--	--	--	--	--	--	--	--
1-Dec-10	24	0.00026125	0.00002375	0.01425	0.0000038	0.001995	11.59	0.027075	0.00285	0.00000095	0.00249375	0.005415	--	2.3275	0.0006555	0.00044175	0.9975	0.000002375	0.33725	0.0465025	0.0000095	0.00000285	2.38E-06	0.002385	0.000238	0.000095	2.61E-05	0.000095	0.000238	4.75E-05
8-Dec-10	25	--	--	0.01365	--	--	10.738	--	--	--	--	--	--	2.2295	--	--	--	--	0.455	--	--	--	--	--	--	--	--	--	--	--
15-Dec-10	26	--	--	0.01275	--	--	9.095	--	--	--	--	--	--	1.87	--	--	--	--	0.2125	--	--	--	--	--	--	--	--	--	--	--
22-Dec-10	27	--	--	0.0172	--	--	9.847	--	--	--	--	--	--	2.021	--	--	--	--	0.258	--	--	--	--	--	--	--	--	--	--	--
29-Dec-10	28	0.000234	0.0000225	0.02115	0.0000198	0.001755	9.675	0.016155	0.00225	0.0000009	0.003024	0.0033075	--	2.241	0.000702	0.000351	0.99	0.0000027	0.315	0.03582	0.000009	0.00000225	2.25E-06	0.002633	0.000225	0.000131	2.61E-05	0.000135	0.00036	0.000045
5-Jan-11	29	--	--	0.0198	--	--	11.1375	--	--	--	--	--	--	2.2275	--	--	--	--	0.3465	--	--	--	--	--	--	--	--	--	--	--
12-Jan-11	30	--	--	0.0264	--	--	9.24																							

Appendix G: Kinetic Data, Humidity Cell Tests

HC-14 Madrid Flotation Tailings

Concentrations																																
Date	Accum. Weeks	Volume (ml)		pH (pH Units)	EC (µS/cm)	ORP (mV)	SO4 (mg/L)	Acidity to pH 4.5	Acidity to pH 8.3	Alkalinity to pH 4.5	Fluoride (mg/L)	Chloride (mg/L)	Nitrate-N (mg/L)	Nitrite-N (mg/L)	Total Ammonia (mgN/L)	Diss.-P (mgP/L)	TDS (mg/L)	Hardness CaCO3 (mg/L)	Al (mg/L)	Sb (mg/L)	As (mg/L)	Ba (mg/L)	Be (mg/L)	Bi (mg/L)	B (mg/L)	Cd (mg/L)	Ca (mg/L)	Cr (mg/L)	Co (mg/L)	Cu (mg/L)	Fe (mg/L)	Pb (mg/L)
		mg CaCO3/L	mg CaCO3/L																													
		5	5	0.01	1	50	1	1	1	1	0.1	0.2	0.02	0.002	0.01	0.001	10	0.02	0.005	0.001	0.001	0.001	0.001	0.001	0.05	0.0002	0.05	0.001	0.001	0.001	0.05	0.001
13-May-09	0	731	430	8.25	405	160	160	--	1	47	0.18	7.23	0.1	0.04	0.21	0.09	276	180	0.046	0.0052	0.323	0.0056	0.0002	0.0002	0.13	0.00004	31.2	0.0002	0.0012	0.0022	0.01	0.0002
20-May-09	1	488	460	7.88	163	175	34	--	1	34	0.07	1.36	0.05	0.004	0.06	0.02	85	61.1	0.028	0.0024	0.142	0.0022	0.0002	0.0002	0.03	0.00004	11.3	0.0002	0.0006	0.0016	0.01	0.0002
27-May-09	2	488	410	8.03	277	140	64	--	1	60	0.11	1.84	0.05	0.008	0.08	0.02	168	121	0.03	0.0033	0.146	0.0035	0.0002	0.0002	0.05	0.00004	21.2	0.0002	0.0012	0.0021	0.01	0.0002
3-Jun-09	3	488	450	8.04	247	150	81	--	1	45	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	21.1	--	--	--	0.01	--
10-Jun-09	4	488	460	8.05	255	145	86	--	1	41	0.07	0.72	0.05	0.02	0.07	0.04	159	113	0.031	0.0023	0.096	0.0029	0.0002	0.0002	0.04	0.00004	20.3	0.0002	0.0009	0.0004	0.01	0.0002
17-Jun-09	5	488	420	8.06	232	145	68	--	1	42	--	--	--	--	--	--	--	--	0.05	--	--	--	--	--	--	--	22.3	--	--	--	0.01	--
24-Jun-09	6	488	470	7.98	314	140	121	--	1	42	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	27.2	--	--	--	0.01	--
1-Jul-09	7	488	455	7.99	289	140	79	--	1	40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	23.3	--	--	--	0.01	--
8-Jul-09	8	488	435	7.93	255	140	88	--	1	41	0.09	0.27	0.26	0.045	0.08	0.04	149	113	0.033	0.0019	0.091	0.0029	0.0002	0.0002	0.03	0.00004	20.3	0.0002	0.0006	0.0002	0.01	0.0002
15-Jul-09	9	488	420	7.91	155	170	39	--	1	32	--	--	--	--	--	0.04	--	--	--	--	--	--	--	--	--	--	14	--	--	--	0.01	--
22-Jul-09	10	488	470	7.92	228	165	81	--	1	35	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	18.4	--	--	--	0.01	--
29-Jul-09	11	488	460	7.95	236	160	86	--	1	40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	19.3	--	--	--	0.01	--
5-Aug-09	12	488	475	7.92	167	170	44	--	1	35	0.05	0.2	0.32	0.002	0.04	0.02	56	64.1	0.032	0.0013	0.086	0.0013	0.0002	0.0002	0.02	0.00004	12.1	0.0002	0.0003	0.0002	0.01	0.0002
12-Aug-09	13	488	445	7.97	234	145	75	--	1	38	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	17.3	--	--	--	0.01	--
19-Aug-09	14	488	425	8.02	197	150	57	--	1	41	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	16.3	--	--	--	0.04	--
26-Aug-09	15	488	430	7.99	195	160	40	--	1	42	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	15	--	--	--	0.01	--
2-Sep-09	16	488	425	8.09	198	150	50	--	1	44	0.1	0.4	0.22	0.002	0.21	0.02	133	79.5	0.041	0.0016	0.122	0.0023	0.0002	0.0002	0.03	0.00004	13	0.0002	0.0004	0.0007	0.01	0.0002
9-Sep-09	17	488	435	8.21	194	150	46	--	1	48	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	15.1	--	--	--	0.01	--
16-Sep-09	18	488	420	8.23	211	145	51	--	1	55	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	15.9	--	--	--	0.01	--
23-Sep-09	19	488	420	8.24	193	150	36	--	1	56	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	15.1	--	--	--	0.01	--
30-Sep-09	20	488	425	8.24	201	150	33	--	1	72	0.14	0.2	0.08	0.002	0.33	0.13	117	99	0.04	0.0031	0.269	0.0019	0.0001	0.0001	0.044	0.00001	14.9	0.0005	0.0004	0.0002	0.01	0.00005
7-Oct-09	21	488	435	8.29	228	165	30	--	1	87	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	16.2	--	--	--	0.01	--
14-Oct-09	22	488	435	8.39	238	165	25	--	--	102	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	17.6	--	--	--	0.01	--
21-Oct-09	23	488	450	8.37	230	135	13	--	--	107	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	17.2	--	--	--	0.01	--
28-Oct-09	24	488	445	8.36	215	125	13	--	--	103	0.14	0.2	0.14	0.002	0.34	0.03	138	113	0.04	0.0038	0.327	0.0018	0.0001	0.0001	0.044	0.00003	15.3	0.0002	0.0003	0.001	0.01	0.00005
4-Nov-09	25	488	430	8.34	211	130	9	--	--	102	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	17.4	--	--	--	0.01	--
11-Nov-09	26	488	450	8.32	206	125	8	--	1	101	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	17.6	--	--	--	0.01	--
18-Nov-09	27	488	410	8.39	209	120	10	--	--	100	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	17.2	--	--	--	0.01	--
25-Nov-09	28	500	405	8.36	206	130	8	--	--	100	0.13	0.2	0.05	0.002	0.27	0.03	92	102	0.046	0.0038	0.366	0.002	0.0001	0.0001	0.025	0.00001	18.6	0.0003	0.0003	0.0003	0.01	0.00005
2-Dec-09	29	500	435	8.31	207	130	7	--	--	103	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	17.4	--	--	--	0.01	--
9-Dec-09	30	500	410	8.37	205	125	6	--	--	103	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	17.3	--	--	--	0.01	--
16-Dec-09	31	500	425	8.38	214	125	6	--	--	107	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	18.3	--	--	--	0.01	--
23-Dec-09	32	500	430	8.41	211	115	7	--	--	106	0.05	0.2	0.13	0.002	0.32	0.02	96	100.578	0.039	0.0031	0.301	0.0018	0.0001	0.0001	0.021	0.00001	14.4	0.0003	0.0002	0.001	0.01	0.00005
30-Dec-09	33	500	430	8.41	202	120	8	--	--	99	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	17.5	--	--	--	0.01	--
6-Jan-10	34	500	410	8.33	202	145	8	--	--	100	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	17.3	--	--	--	0.01	--
13-Jan-10	35	500	465	8.33	205	145	8	--	--	101	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	18.3	--	--	--	0.01	--
20-Jan-10	36	500	435	8.26	206	130	9	--	1	101	0.05	0.2	0.46	0.003	0.16	0.02	67	104.1753	0.035	0.0024	0.239	0.0015	0.0001	0.0001	0.014	0.00001	16.5	0.0002	0.0002	0.0004	0.01	0.00005
27-Jan-10	37	500	400	8.35	224	125	12	--	--	105	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	19.4	--	--	--	0.02	--
3-Feb-10	38	500	430	8.37	215	120	11	--	--	103	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	19.5	--	--	--	0.01	--
10-Feb-10	39	500	425	8.34	216	125	12	--	--	100	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	19	--	--	--	0.01	--
17-Feb-10	40	500	415	8.24	212	135	15	--	1	101	0.05	0.2	0.77	0.002	0.06	0.03	96	119.6953	0.041	0.0021	0.191	0.0023	0.0001	0.0001	0.014	0.00001	18.1	0.0004	0.0002	0.0006	0.01	0.00005
24-Feb-10	41	500	445	8.37	223	160	19	--	--	101	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	19.9	--	--	--	0.01	--
3-Mar-10	42	500	415	8.28	227	140	18	--	1	100	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	18.7	--	--	--	0.01	--
10-Mar-10	43	500	445	8.29	226	150	18	--	1	104	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	19.6	--	--	--	0.01	--
17-Mar-10	44	500	425	8.33	227	145	17	--	--	104	0.05	0.2	0.54	0.002	0.01	--	114	115.5052	0.035	0.0021	0.185	0.0025	0.0001	0.0001	0.013	0.00002	18.4	0.0004	0.0002	0.0002	0.01	0.00005
24-Mar-10	45	500	445	8.25	219	150	21	--	1	94	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	18.8	--	--	--	0.01	--
31-Mar-10	46	500	430	8.22	249	150	22	--	1	109	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	21.4	--	--	--	0.01	--
7-Apr-10	47	500	435	8.3	239	175	20	--	--	106	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	19	--	--	--	0.01	--
14-Apr-10	48	500	455	8.23	252	175	22	--	1	103	0.03	0.5	0.33	0.005	0.01	0.046	110	130.4517	0.041	0.0021	0.141	0.003	0.0001	0.001	0.05	0.00001	20.1	0.001	0.0005	0.0003	0.005	0.0002
21-Apr-10	49	500	420	8.33	234	150	23	--																								

Appendix G: Kinetic Data, Humidity Cell Tests

HC-14		Flotation Tailings		Concentrations																													
Date	Accum. Weeks	Volume (ml)		pH (pH Units)	EC (µS/cm)	ORP (mV)	SO4 (mg/L)	Acidity to pH 4.5	Acidity to pH 8.3	Alkalinity to pH 4.5	Fluoride (mg/L)	Chloride (mg/L)	Nitrate-N (mg/L)	Nitrite-N (mg/L)	Total Ammonia (mgN/L)	Diss.-P (mgP/L)	TDS (mg/L)	Hardness CaCO3 (mg/L)	Al (mg/L)	Sb (mg/L)	As (mg/L)	Ba (mg/L)	Be (mg/L)	Bi (mg/L)	B (mg/L)	Cd (mg/L)	Ca (mg/L)	Cr (mg/L)	Co (mg/L)	Cu (mg/L)	Fe (mg/L)	Pb (mg/L)	
		mg	CaCO3/L																														
		5	5	0.01	1	50	1	1	1	1	0.1	0.2	0.02	0.002	0.01	0.001	10	0.02	0.005	0.001	0.001	0.001	0.001	0.001	0.05	0.0002	0.05	0.001	0.001	0.001	0.05	0.001	
3-Nov-10	77	500	420	8.1	121	145	13	--	1	48	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	9.02	--	--	--	--	0.01	--
10-Nov-10	78	500	430	8.14	145	150	16	--	1	55	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	11.1	--	--	--	--	0.01	--
17-Nov-10	79	500	450	8.22	127	145	10	--	1	50	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	9.66	--	--	--	--	0.07	--
24-Nov-10	80	500	420	8.26	127	155	12	--	1	50	0.01	0.5	0.11	0.005	0.09	0.005	64	64.91058	0.0254	0.00063	0.0308	0.00076	0.00001	0.000005	0.05	0.000005	9.66	0.0007	0.0001	0.00021	0.007	0.000013	
1-Dec-10	81	500	420	8.25	138	145	12	--	1	55	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	9.02	--	--	--	--	0.01	--
8-Dec-10	82	500	445	8.18	145	145	12	--	1	54	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	9.22	--	--	--	--	0.01	--
15-Dec-10	83	500	440	8.18	136	140	11	--	1	54	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	8.32	--	--	--	--	0.01	--
22-Dec-10	84	500	425	8.2	140	140	9	--	1	57	--	0.5	--	--	--	--	--	66	0.0225	0.00061	0.0298	0.00087	0.00001	0.000005	0.05	0.000005	9.33	0.0007	0.0001	0.00015	0.006	0.000005	
29-Dec-10	85	500	435	8.25	136	140	11	--	1	55	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	9.05	--	--	--	--	0.01	--
5-Jan-11	86	500	435	8.09	135	140	10	--	1	56	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	9.32	--	--	--	--	0.01	--
12-Jan-11	87	500	440	8.18	151	125	10	--	1	61	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	9.47	--	--	--	--	0.01	--
19-Jan-11	88	500	430	8.07	137	150	13	--	1	65	0.07	0.5	0.14	0.005	0.06	0.013	68	79.1	0.0247	0.00085	0.041	0.00123	0.00001	0.000005	0.05	0.000005	10.6	0.0009	8E-05	0.00029	0.002	0.000011	
26-Jan-11	89	500	435	8.23	139	135	8	--	1	57	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	10.3	--	--	--	--	0.01	--
2-Feb-11	90	500	495	8.35	135	165	9	--	--	56	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	9.63	--	--	--	--	0.01	--
9-Feb-11	91	500	430	8.16	129	150	8	--	1	55	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	9.89	--	--	--	--	--	--
16-Feb-11	92	500	420	8.33	129	145	7	--	--	53	--	0.5	--	--	--	--	--	55.7	0.0225	0.00053	0.0311	0.00065	0.00001	0.000005	0.05	0.000005	7.53	0.0005	8E-05	0.00032	0.005	0.000009	
23-Feb-11	93	500	455	8.17	125	125	6	--	1	53	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.74	--	--	--	--	0.01	--
2-Mar-11	94	500	420	8.12	135	130	7	--	1	56	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	9.27	--	--	--	--	0.01	--
9-Mar-11	95	500	440	8.25	136	120	8	--	1	58	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	9.03	--	--	--	--	0.01	--
16-Mar-11	96	500	420	8.02	124	150	6	--	1	52	0.01	0.7	0.11	0.005	0.032	0.017	64	57.6	0.0273	0.00049	0.0287	0.00073	0.00001	0.000005	0.05	0.000005	8.66	0.0005	6E-05	0.00014	0.006	0.000009	
23-Mar-11	97	500	420	8.35	119	160	6	--	--	52	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.72	--	--	--	--	0.01	--
30-Mar-11	98	500	430	8.34	105	155	5	--	--	45	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.11	--	--	--	--	0.01	--
6-Apr-11	99	500	460	8.19	104	110	2.9	--	--	45	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	8.75	--	--	--	--	0.01	--
13-Apr-11	100	500	445	8.2	116	110	4.1	--	1	47	--	0.5	--	--	--	--	--	51.8	0.0212	0.0004	0.0241	0.00206	0.00001	0.000005	0.05	0.000005	8.08	0.0004	9E-05	0.00013	0.006	0.000005	
20-Apr-11	101	500	435	7.85	104	110	3.8	--	2	45	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.74	--	--	--	--	0.01	--
27-Apr-11	102	500	425	8.14	115	150	3.7	--	1	49	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	8.18	--	--	--	--	0.01	--
4-May-11	103	500	420	8.24	125	125	7.6	--	1	53	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.83	--	--	--	--	0.01	--
11-May-11	104	500	460	8.22	123	110	5.1	--	1	51	0.01	0.5	0.14	0.005	0.065	0.009	52	54.8	0.0217	0.00044	0.0208	0.00078	0.00001	0.000005	0.05	0.000005	8.03	0.0005	6E-05	0.00012	0.003	0.000011	
18-May-11	105	500	425	8.18	133	150	5.6	--	1	50	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	9.42	--	--	--	--	0.01	--
25-May-11	106	500	450	8.3	213	155	12	--	--	93	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	12.2	--	--	--	--	0.01	--
1-Jun-11	107	500	420	8.27	144	145	5.4	--	1	65	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	8.95	--	--	--	--	0.01	--
8-Jun-11	108	500	440	8.24	141	160	3.6	--	1	60	--	0.6	--	--	--	--	--	67.4	0.0324	0.00057	0.0398	0.00069	0.00001	0.000005	0.05	0.000013	10.1	0.0005	7E-05	0.0002	0.005	0.000012	
15-Jun-11	109	500	445	8.31	181	135	7	--	--	81	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	11	--	--	--	--	0.01	--
22-Jun-11	110	500	420	8.48																													

Appendix G: Kinetic Data, Humidity Cell Tests

Madrid
Flotation
HC-14 Tailings

Concentrations																							
Date	Accum. Weeks	Li (mg/L)	Mg (mg/L)	Mn (mg/L)	Hg (mg/L)	Mo (mg/L)	Ni (mg/L)	P (mg/L)	K (mg/L)	Se (mg/L)	Si (mg/L)	Ag (mg/L)	Na (mg/L)	Sr (mg/L)	Te (mg/L)	Ti (mg/L)	Th (mg/L)	Sn (mg/L)	Ti (mg/L)	U (mg/L)	V (mg/L)	Zn (mg/L)	Zr (mg/L)
		0.001	0.05	0.001	0.000002	0.0005	0.001	0.15	0.1	0.001	0.25	0.00025	0.05	0.001	0.001	0.0001	0.0005	0.001	0.001	0.0005	0.001	0.005	0.01
13-May-09	0	0.0036	24.9	0.031	0.00002	0.014	0.024	0.03	9.62	0.0026	1.39	0.00005	10.6	0.099	0.0002	0.00003	0.0001	0.001	0.0002	0.0001	0.0009	0.001	0.002
20-May-09	1	0.0013	7.95	0.024	0.00002	0.0036	0.0089	0.03	4.75	0.0009	0.77	0.00005	2.61	0.033	0.0002	0.00002	0.0001	0.0003	0.0002	0.0001	0.0005	0.001	0.002
27-May-09	2	0.0022	16.6	0.043	0.00002	0.0061	0.016	0.03	6.83	0.0013	1.15	0.00005	3.92	0.071	0.0002	0.00002	0.0001	0.0004	0.0002	0.0001	0.0005	0.001	0.002
3-Jun-09	3	--	16.2	--	--	--	--	--	5.2	--	--	--	2.7	--	--	--	--	--	--	--	--	--	--
10-Jun-09	4	0.0017	15	0.04	0.00002	0.0044	0.008	0.03	4.78	0.0014	0.84	0.00005	2.25	0.064	0.0002	0.00002	0.0001	0.0002	0.0002	0.0001	0.0004	0.001	0.002
17-Jun-09	5	--	15.7	--	--	--	--	--	4.6	--	--	--	2.1	--	--	--	--	--	--	--	--	--	--
24-Jun-09	6	--	22.5	--	--	--	--	--	5.1	--	--	--	2.6	--	--	--	--	--	--	--	--	--	--
1-Jul-09	7	--	18.6	--	--	--	--	--	3.8	--	--	--	2	--	--	--	--	--	--	--	--	--	--
8-Jul-09	8	0.0017	15.1	0.039	0.00002	0.0045	0.005	0.03	3.71	0.0011	0.82	0.00005	1.56	0.057	0.0002	0.00002	0.0001	0.0002	0.0002	0.0001	0.0003	0.001	0.002
15-Jul-09	9	--	9.88	--	--	--	--	--	2	--	--	--	0.9	--	--	--	--	--	--	--	--	--	--
22-Jul-09	10	--	15.7	--	--	--	--	--	3.7	--	--	--	1.7	--	--	--	--	--	--	--	--	--	--
29-Jul-09	11	--	16.6	--	--	--	--	--	3.7	--	--	--	1.6	--	--	--	--	--	--	--	--	--	--
5-Aug-09	12	0.001	8.23	0.027	0.00002	0.0026	0.0021	0.11	2.45	0.0007	0.57	0.00005	0.96	0.031	0.0002	0.00002	0.0001	0.0002	0.0002	0.0001	0.0003	0.001	0.002
12-Aug-09	13	--	16.5	--	--	--	--	--	3.7	--	--	--	1.1	--	--	--	--	--	--	--	--	--	--
19-Aug-09	14	--	13.8	--	--	--	--	--	3.1	--	--	--	1.3	--	--	--	--	--	--	--	--	--	--
26-Aug-09	15	--	13.1	--	--	--	--	--	3.1	--	--	--	1.2	--	--	--	--	--	--	--	--	--	--
2-Sep-09	16	0.001	11.4	0.022	0.00002	0.004	0.0023	0.03	2.75	0.0009	0.91	0.00005	1.12	0.041	0.0002	0.00002	0.0001	0.0002	0.0002	0.0001	0.0004	0.005	0.002
9-Sep-09	17	--	13.9	--	--	--	--	--	3.1	--	--	--	1.3	--	--	--	--	--	--	--	--	--	--
16-Sep-09	18	--	16	--	--	--	--	--	3.6	--	--	--	1.5	--	--	--	--	--	--	--	--	--	--
23-Sep-09	19	--	14.6	--	--	--	--	--	3.3	--	--	--	1.3	--	--	--	--	--	--	--	--	--	--
30-Sep-09	20	0.0024	15	0.012	0.00002	0.0056	0.0028	0.015	3.56	0.0008	1.58	0.00004	1.33	0.04	0.0002	0.00002	0.00005	0.0001	0.0007	0.00005	0.0007	0.001	0.0001
7-Oct-09	21	--	17.6	--	--	--	--	--	4.3	--	--	--	1.6	--	--	--	--	--	--	--	--	--	--
14-Oct-09	22	--	19.6	--	--	--	--	--	4.5	--	--	--	1.4	--	--	--	--	--	--	--	--	--	--
21-Oct-09	23	--	18.5	--	--	--	--	--	3.9	--	--	--	1.2	--	--	--	--	--	--	--	--	--	--
28-Oct-09	24	0.0043	18.2	0.0036	0.00002	0.0025	0.0023	0.015	2.99	0.0002	2.43	0.00004	1.01	0.042	0.0002	0.00002	0.00005	0.0001	0.0005	0.00005	0.0009	0.001	0.0001
4-Nov-09	25	--	17.4	--	--	--	--	--	3.1	--	--	--	0.9	--	--	--	--	--	--	--	--	--	--
11-Nov-09	26	--	17.4	--	--	--	--	--	2.9	--	--	--	0.8	--	--	--	--	--	--	--	--	--	--
18-Nov-09	27	--	17.5	--	--	--	--	--	2.6	--	--	--	0.9	--	--	--	--	--	--	--	--	--	--
25-Nov-09	28	0.0021	13.5	0.0024	0.00002	0.0028	0.0021	0.015	2.8	0.0008	2.09	0.00004	0.66	0.038	0.0002	0.00002	0.00005	0.0001	0.0004	0.00005	0.0011	0.001	0.0001
2-Dec-09	29	--	17.8	--	--	--	--	--	2.4	--	--	--	0.8	--	--	--	--	--	--	--	--	--	--
9-Dec-09	30	--	17.6	--	--	--	--	--	2.3	--	--	--	0.8	--	--	--	--	--	--	--	--	--	--
16-Dec-09	31	--	18	--	--	--	--	--	2.2	--	--	--	0.7	--	--	--	--	--	--	--	--	--	--
23-Dec-09	32	0.0029	15.7	0.0016	0.00002	0.0029	0.0021	0.03	1.99	0.0006	2.1	0.00004	0.68	0.038	0.0002	0.00002	0.00005	0.0001	0.0002	0.00005	0.0008	0.001	0.0001
30-Dec-09	33	--	17.5	--	--	--	--	--	1.9	--	--	--	0.7	--	--	--	--	--	--	--	--	--	--
6-Jan-10	34	--	16.8	--	--	--	--	--	1.7	--	--	--	0.7	--	--	--	--	--	--	--	--	--	--
13-Jan-10	35	--	17.7	--	--	--	--	--	1.8	--	--	--	0.7	--	--	--	--	--	--	--	--	--	--
20-Jan-10	36	0.0025	15.3	0.0012	0.00002	0.0036	0.002	0.015	1.62	0.0006	1.96	0.00004	0.55	0.035	0.0002	0.00002	0.00005	0.0001	0.0002	0.00005	0.0007	0.001	0.0001
27-Jan-10	37	--	19.3	--	--	--	--	--	2.3	--	--	--	0.8	--	--	--	--	--	--	--	--	--	--
3-Feb-10	38	--	18.2	--	--	--	--	--	2.4	--	--	--	0.7	--	--	--	--	--	--	--	--	--	--
10-Feb-10	39	--	18.1	--	--	--	--	--	2.6	--	--	--	0.6	--	--	--	--	--	--	--	--	--	--
17-Feb-10	40	0.0022	18.1	0.0009	0.00002	0.005	0.0021	0.015	3.01	0.0004	1.95	0.00004	0.77	0.0385	0.0002	0.00002	0.00005	0.0001	0.0003	0.00005	0.0006	0.003	0.0001
24-Feb-10	41	--	18.3	--	--	--	--	--	3.2	--	--	--	0.7	--	--	--	--	--	--	--	--	--	--
3-Mar-10	42	--	17.8	--	--	--	--	--	3.4	--	--	--	0.8	--	--	--	--	--	--	--	--	--	--
10-Mar-10	43	--	18.6	--	--	--	--	--	3.7	--	--	--	0.7	--	--	--	--	--	--	--	--	--	--
17-Mar-10	44	0.0026	16.9	0.0011	0.00002	0.006	0.0021	0.015	3.8	0.0007	1.84	0.00004	0.67	0.039	0.0002	0.00002	0.00005	0.0001	0.0002	0.00005	0.0006	0.001	0.0001
24-Mar-10	45	--	17.7	--	--	--	--	--	3.7	--	--	--	0.7	--	--	--	--	--	--	--	--	--	--
31-Mar-10	46	--	21.9	--	--	--	--	--	4.6	--	--	--	0.7	--	--	--	--	--	--	--	--	--	--
7-Apr-10	47	--	18.7	--	--	--	--	--	3.5	--	--	--	0.6	--	--	--	--	--	--	--	--	--	--
14-Apr-10	48	0.005	19.5	0.001	0.00002	0.007	0.002	0.01	3.88	0.0003	2.01	0.00002	0.67.										

Appendix G: Kinetic Data, Humidity Cell Tests

Madrid
Flotation
HC-14 Tailings

Concentrations																							
Date	Accum. Weeks	Li (mg/L)	Mg (mg/L)	Mn (mg/L)	Hg (mg/L)	Mo (mg/L)	Ni (mg/L)	P (mg/L)	K (mg/L)	Se (mg/L)	Si (mg/L)	Ag (mg/L)	Na (mg/L)	Sr (mg/L)	Te (mg/L)	Tl (mg/L)	Th (mg/L)	Sn (mg/L)	Ti (mg/L)	U (mg/L)	V (mg/L)	Zn (mg/L)	Zr (mg/L)
		0.001	0.05	0.001	0.000002	0.0005	0.001	0.15	0.1	0.001	0.25	0.00025	0.05	0.001	0.001	0.0001	0.0005	0.001	0.001	0.0005	0.001	0.005	0.01
3-Nov-10	77	--	8.74	--	--	--	--	--	0.6	--	--	--	0.3	--	--	--	--	--	--	--	--	--	--
10-Nov-10	78	--	11.7	--	--	--	--	--	0.8	--	--	--	0.4	--	--	--	--	--	--	--	--	--	--
17-Nov-10	79	--	9.91	--	--	--	--	--	0.7	--	--	--	0.3	--	--	--	--	--	--	--	--	--	--
24-Nov-10	80	0.0008	9.91	0.00564	0.000003	0.00216	0.00094	0.003	0.94	0.00014	0.6	0.000005	0.32	0.016	0.00002	0.000005	0.000005	0.00005	0.0011	0.000007	0.0005	0.0001	0.0001
1-Dec-10	81	--	10.5	--	--	--	--	--	0.8	--	--	--	0.3	--	--	--	--	--	--	--	--	--	--
8-Dec-10	82	--	10.7	--	--	--	--	--	0.8	--	--	--	0.5	--	--	--	--	--	--	--	--	--	--
15-Dec-10	83	--	10.5	--	--	--	--	--	0.7	--	--	--	0.2	--	--	--	--	--	--	--	--	--	--
22-Dec-10	84	0.0008	10.4	0.00612	0.000002	0.0019	0.00101	0.002	0.9	0.00011	0.7	0.000005	0.33	0.0155	0.00002	0.000006	0.000005	0.00007	0.0005	0.000004	0.0003	0.0001	0.0001
29-Dec-10	85	--	10.5	--	--	--	--	--	0.6	--	--	--	0.3	--	--	--	--	--	--	--	--	--	--
5-Jan-11	86	--	11.1	--	--	--	--	--	0.6	--	--	--	0.3	--	--	--	--	--	--	--	--	--	--
12-Jan-11	87	--	12.3	--	--	--	--	--	0.8	--	--	--	0.3	--	--	--	--	--	--	--	--	--	--
19-Jan-11	88	0.001	12.8	0.00173	0.000002	0.00192	0.00079	0.002	1.11	0.00012	0.9	0.000005	0.42	0.0172	0.00002	0.000005	0.000005	0.00007	0.0005	0.000005	0.0002	0.0001	0.0001
26-Jan-11	89	--	11.2	--	--	--	--	--	0.8	--	--	--	0.3	--	--	--	--	--	--	--	--	--	--
2-Feb-11	90	--	10.5	--	--	--	--	--	1.8	--	--	--	1.1	--	--	--	--	--	--	--	--	--	--
9-Feb-11	91	--	10.5	--	--	--	--	--	0.6	--	--	--	0.3	--	--	--	--	--	--	--	--	--	--
16-Feb-11	92	0.0007	8.95	0.00386	0.000002	0.00134	0.00072	0.002	0.76	0.00019	0.6	0.000005	0.29	0.0132	0.00002	0.000004	0.000005	0.00005	0.0005	0.000009	0.0002	0.0001	0.0001
23-Feb-11	93	--	9.65	--	--	--	--	--	0.5	--	--	--	0.3	--	--	--	--	--	--	--	--	--	--
2-Mar-11	94	--	11.5	--	--	--	--	--	0.6	--	--	--	0.3	--	--	--	--	--	--	--	--	--	--
9-Mar-11	95	--	10.6	--	--	--	--	--	0.7	--	--	--	0.3	--	--	--	--	--	--	--	--	--	--
16-Mar-11	96	0.0007	8.73	0.00309	0.000002	0.00094	0.00086	0.003	0.75	0.0001	0.6	0.000005	0.3	0.014	0.00002	0.000006	0.000005	0.00004	0.0005	0.000004	0.0003	0.0001	0.0001
23-Mar-11	97	--	8.2	--	--	--	--	--	0.5	--	--	--	0.1	--	--	--	--	--	--	--	--	--	--
30-Mar-11	98	--	7.64	--	--	--	--	--	0.6	--	--	--	0.3	--	--	--	--	--	--	--	--	--	--
6-Apr-11	99	--	7.32	--	--	--	--	--	0.7	--	--	--	0.4	--	--	--	--	--	--	--	--	--	--
13-Apr-11	100	0.0005	7.68	0.00563	0.000002	0.00091	0.00088	0.011	0.68	0.00009	0.6	0.000005	0.29	0.0423	0.00002	0.000002	0.000005	0.00008	0.0005	0.000007	0.0002	0.0002	0.0001
20-Apr-11	101	--	7.85	--	--	--	--	--	0.7	--	--	--	0.2	--	--	--	--	--	--	--	--	--	--
27-Apr-11	102	--	8.7	--	--	--	--	--	0.5	--	--	--	0.3	--	--	--	--	--	--	--	--	--	--
4-May-11	103	--	9.32	--	--	--	--	--	0.6	--	--	--	0.6	--	--	--	--	--	--	--	--	--	--
11-May-11	104	0.0006	8.43	0.00309	0.000002	0.00093	0.00071	0.01	0.65	0.00008	0.6	0.000005	0.29	0.0137	0.00002	0.000006	0.000005	0.00013	0.0005	0.000009	0.0002	0.0008	0.0001
18-May-11	105	--	10.3	--	--	--	--	--	0.6	--	--	--	0.4	--	--	--	--	--	--	--	--	--	--
25-May-11	106	--	20	--	--	--	--	--	0.9	--	--	--	0.5	--	--	--	--	--	--	--	--	--	--
1-Jun-11	107	--	12.6	--	--	--	--	--	1	--	--	--	0.3	--	--	--	--	--	--	--	--	--	--
8-Jun-11	108	0.0007	10.3	0.00107	0.000002	0.00096	0.00082	0.015	0.75	0.00009	0.7	0.000005	0.31	0.016	0.00002	0.000004	0.000005	0.00009	0.0005	0.000019	0.0002	0.0035	0.0002
15-Jun-11	109	--	15.2	--	--	--	--	--	0.8	--	--	--	0.4	--	--	--	--	--	--	--	--	--	--
22-Jun-11	110	--	12.1	--	--	--	--	--	0.9	--	--	--	0.4	--	--	--	--	--	--	--	--	--	--
29-Jun-11	111	--	14.5	--	--	--	--	--	1.1	--	--	--	0.4	--	--	--	--	--	--	--	--	--	--
6-Jul-11	112	0.0014	16.6	0.00019	0.000002	0.0013	0.00102	0.002	1.16	0.0002	1.3	0.000005	0.45	0.0212	0.00002	0.000008	0.000005	0.00008	0.0005	0.000008	0.0002	0.0004	0.0001
13-Jul-11	113	--	16.7	--	--	--	--	--	1	--	--	--	0.4	--	--	--	--	--	--	--	--	--	--
20-Jul-11	114	--	13.5	--	--	--	--	--	0.7	--	--	--	0.3	--	--	--	--	--	--	--	--	--	--
27-Jul-11	115	--	21.8	--	--	--	--	--	1.3	--	--	--	0.6	--	--	--	--	--	--	--	--	--	--
3-Aug-11	116	0.0016	20.5	0.00018	0.000002	0.00123	0.00106	0.013	1.34	0.00054	1.5	0.000012	0.49	0.0212	0.00002	0.00001	0.000005	0.0001	0.0005	0.000011	0.0003	0.0009	0.0001
10-Aug-11	117	--	20.5	--	--	--	--	--	1.2	--	--	--	0.6	--	--	--	--	--	--	--	--	--	--
17-Aug-11	118	--	16	--	--	--	--	--	1	--	--	--	0.1	--	--	--	--	--	--	--	--	--	--
24-Aug-11	119	--	15.3	--	--	--	--	--	0.5	--	--	--	0.2	--	--	--	--	--	--	--	--	--	--
31-Aug-11	120	0.0007	6.83	0.00253	0.000002	0.00024	0.0008	0.008	0.52	0.00006	0.6	0.000005	0.14	0.0128	0.00002	0.000003	0.000005	0.00005	0.0005	0.000004	0.0002	0.0008	0.0001
7-Sep-11	121	--	8.18	--	--	--	--	--	0.5	--	--	--	0.1	--	--	--	--	--	--	--	--	--	--
14-Sep-11	122	--	8.75	--	--	--	--	--	0.5	--	--	--	0.1	--	--	--	--	--	--	--	--	--	--
21-Sep-11	123	--	9.67	--	--	--	--	--	0.5	--	--	--	0.1	--	--	--	--	--	--	--	--	--	--
28-Sep-11	124	0.0007	8.28	0.00319	0.000007	0.00047	0.00095	0.012	0.56	0.00012	0.6	0.000005	0.2	0.0196	0.00002	0.000003	0.000005	0.00007	0.0005	0.000003	0.0002	0.0078	0.0001
5-Oct-11	125	--	12.4	--	--	--	--	--	0.3	--	--	--	0.3	--	--	--	--	--	--	--	--	--	--
12-Oct-11	126	--	12.6	--	--	--	--	--	0.5	--	--	--	0.2	--	--	--	--	--	--	--	--	--	--
19-Oct-11	127	--	12.5	--	--	--	--	--	0.5	--	--	--	0.2	--	--	--	--	--	--	--	--	--	--
26-Oct-11	128	0.0009	11.1	0.00379	0.																		

Appendix G: Kinetic Data, Humidity Cell Tests

HC-14		Madrid Flotation Tailings		Loading Calculations																											
Date	Accum. Weeks	SO4 mg/kg/wk	Acidity to pH 4.5 mg/kg/week	Acidity to pH 8.3	Total Alkalinity mg/kg/wk	Fluoride mg/kg/wk	Chloride mg/kg/wk	Nitrate-N mg/kg/wk	Nitrite-N mg/kg/wk	Total Ammonia mg/kg/wk	Diss.-P mg/kg/wk	TDS mg/kg/wk	Hardness CaCO3 mg/kg/wk	Al mg/kg/wk	Sb mg/kg/wk	As mg/kg/wk	Ba mg/kg/wk	Be mg/kg/wk	Bi mg/kg/wk	B mg/kg/wk	Cd mg/kg/wk	Ca mg/kg/wk	Cr mg/kg/wk	Co mg/kg/wk	Cu mg/kg/wk	Fe mg/kg/wk	Pb mg/kg/wk	Li mg/kg/wk			
13-May-09	0	70.564	--	0.441	20.728	0.0794	3.1886	0.0441	0.0176	0.0926	0.0397	121.7231	79.3846	0.0203	0.00229	0.1425	0.002470	0.000088	0.000088	0.057333	0.000018	13.760	0.0000882	0.0005292	0.0009703	0.00441	0.000088	0.001588			
20-May-09	1	16.041	--	0.472	16.041	0.0330	0.6416	0.0236	0.0019	0.0283	0.0094	40.1026	28.8267	0.0132	0.00113	0.0670	0.001038	0.000094	0.000094	0.014154	0.000019	5.331	0.0000944	0.0002831	0.0007549	0.00472	0.000094	0.000613			
27-May-09	2	26.913	--	0.421	25.231	0.0463	0.7737	0.0210	0.0034	0.0336	0.0084	70.6462	50.8821	0.0126	0.00139	0.0614	0.001472	0.000084	0.000084	0.021026	0.000017	8.915	0.0000841	0.0005046	0.0008831	0.00421	0.000084	0.000925			
3-Jun-09	3	37.385	--	0.462	20.769	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	9.738	--	--	--	0.00462	--	--			
10-Jun-09	4	40.574	--	0.472	19.344	0.0330	0.3397	0.0236	0.0094	0.0330	0.0189	75.0154	53.3128	0.0146	0.00109	0.0453	0.001368	0.000094	0.000094	0.018872	0.000019	9.577	0.0000944	0.0004246	0.0001887	0.00472	0.000094	0.000802			
17-Jun-09	5	29.292	--	0.431	18.092	--	--	--	--	--	--	--	--	0.0215	--	--	--	--	--	--	--	9.606	--	--	--	0.00431	--	--			
24-Jun-09	6	58.328	--	0.482	20.246	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	13.112	--	--	--	0.00482	--	--			
1-Jul-09	7	36.867	--	0.467	18.667	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	10.873	--	--	--	0.00467	--	--			
8-Jul-09	8	39.262	--	0.446	18.292	0.0402	0.1205	0.1160	0.0201	0.0357	0.0178	66.4769	50.4154	0.0147	0.00085	0.0406	0.001294	0.000089	0.000089	0.013385	0.000018	9.057	0.0000892	0.0002677	0.0000892	0.00446	0.000089	0.000758			
15-Jul-09	9	16.800	--	0.431	13.785	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6.031	--	--	--	0.00431	--	--			
22-Jul-09	10	39.046	--	0.482	16.872	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	8.870	--	--	--	0.00482	--	--			
29-Jul-09	11	40.574	--	0.472	18.872	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	9.106	--	--	--	0.00472	--	--			
5-Aug-09	12	21.436	--	0.487	17.051	0.0244	0.0974	0.1559	0.0010	0.0195	0.0097	27.2821	31.2282	0.0156	0.00063	0.0419	0.000633	0.000097	0.000097	0.009744	0.000019	5.895	0.0000974	0.0001462	0.0000974	0.00487	0.000097	0.000487			
12-Aug-09	13	34.231	--	0.456	17.344	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.896	--	--	--	0.00456	--	--			
19-Aug-09	14	24.846	--	0.436	17.872	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.105	--	--	--	0.01744	--	--			
26-Aug-09	15	17.641	--	0.441	18.523	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6.615	--	--	--	0.00441	--	--			
2-Sep-09	16	21.795	--	0.436	19.179	0.0436	0.1744	0.0959	0.0009	0.0915	0.0087	57.9744	34.6538	0.0179	0.00070	0.0532	0.001003	0.000087	0.000087	0.013077	0.000017	5.667	0.0000872	0.0001744	0.0003051	0.00436	0.000087	0.000436			
9-Sep-09	17	20.523	--	0.446	21.415	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6.737	--	--	--	0.00446	--	--			
16-Sep-09	18	21.969	--	0.431	23.692	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6.849	--	--	--	0.00431	--	--			
23-Sep-09	19	15.508	--	0.431	24.123	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6.505	--	--	--	0.00431	--	--			
30-Sep-09	20	14.385	--	0.436	31.385	0.0610	0.0872	0.0349	0.0009	0.1438	0.0567	51.0000	43.1538	0.0174	0.00135	0.1173	0.000828	0.000044	0.000044	0.019179	0.000004	6.495	0.0002179	0.0001744	0.0000872	0.00436	0.000022	0.001046			
7-Oct-09	21	13.385	--	0.446	38.815	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.228	--	--	--	0.00446	--	--			
14-Oct-09	22	11.154	--	--	45.508	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.852	--	--	--	0.00446	--	--			
21-Oct-09	23	6.000	--	--	49.385	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.938	--	--	--	0.00462	--	--			
28-Oct-09	24	5.933	--	--	47.010	0.0639	0.0913	0.0639	0.0009	0.1552	0.0137	62.9846	51.5744	0.0183	0.00173	0.1492	0.000822	0.000046	0.000046	0.020082	0.000014	6.983	0.0000913	0.0001369	0.0004564	0.00456	0.000023	0.001963			
4-Nov-09	25	3.969	--	--	44.985	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.674	--	--	--	0.00441	--	--			
11-Nov-09	26	3.692	--	0.462	46.615	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	8.123	--	--	--	0.00462	--	--			
18-Nov-09	27	4.205	--	--	42.051	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.233	--	--	--	0.00421	--	--			
25-Nov-09	28	3.323	--	--	41.538	0.0540	0.0831	0.0208	0.0008	0.1122	0.0125	38.2154	42.3692	0.0191	0.00158	0.1520	0.000831	0.000042	0.000042	0.010385	0.000004	7.726	0.0001246	0.0001246	0.0001246	0.00415	0.000021	0.000872			
2-Dec-09	29	3.123	--	--	45.954	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.763	--	--	--	0.00446	--	--			
9-Dec-09	30	2.523	--	--	43.313	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.275	--	--	--	0.00421	--	--			
16-Dec-09	31	2.615	--	--																											

Appendix G: Kinetic Data, Humidity Cell Tests

HC-14		Madrid Flotation Tailings		Loading Calculations																											
Date	Accum. Weeks	SO4 mg/kg/wk	Acidity to pH 4.5 mg/kg/week	Acidity to pH 8.3	Total Alkalinity mg/kg/wk	Fluoride mg/kg/wk	Chloride mg/kg/wk	Nitrate-N mg/kg/wk	Nitrite-N mg/kg/wk	Total Ammonia mg/kg/wk	Diss.-P mg/kg/wk	TDS mg/kg/wk	Hardness CaCO3 mg/kg/wk	Al mg/kg/wk	Sb mg/kg/wk	As mg/kg/wk	Ba mg/kg/wk	Be mg/kg/wk	Bi mg/kg/wk	B mg/kg/wk	Cd mg/kg/wk	Ca mg/kg/wk	Cr mg/kg/wk	Co mg/kg/wk	Cu mg/kg/wk	Fe mg/kg/wk	Pb mg/kg/wk	Li mg/kg/wk			
3-Nov-10	77	5.600	--	0.431	20.677	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3.886	--	--	--	0.00431	--	--			
10-Nov-10	78	7.056	--	0.441	24.256	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4.895	--	--	--	0.00441	--	--			
17-Nov-10	79	4.615	--	0.462	23.077	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4.458	--	--	--	0.03231	--	--			
24-Nov-10	80	5.169	--	0.431	21.538	0.0043	0.2154	0.0474	0.0022	0.0388	0.0022	27.5692	27.9615	0.0109	0.00027	0.0133	0.000327	0.000004	0.000002	0.021538	0.000002	4.161	0.0003015	0.0000478	0.0000905	0.00302	0.000006	0.000345			
1-Dec-10	81	5.169	--	0.431	23.692	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3.886	--	--	--	0.00431	--	--			
8-Dec-10	82	5.477	--	0.456	24.646	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4.208	--	--	--	0.00456	--	--			
15-Dec-10	83	4.964	--	0.451	24.369	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3.755	--	--	--	0.00451	--	--			
22-Dec-10	84	3.923	--	0.436	24.846	--	0.2179	--	--	--	--	--	28.7692	0.0098	0.00027	0.0130	0.000379	0.000004	0.000002	0.021795	0.000002	4.067	0.0003051	0.0000449	0.0000654	0.00262	0.000002	0.000349			
29-Dec-10	85	4.908	--	0.446	24.538	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4.038	--	--	--	0.00446	--	--			
5-Jan-11	86	4.462	--	0.446	24.985	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4.158	--	--	--	0.00446	--	--			
12-Jan-11	87	4.513	--	0.451	27.528	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4.274	--	--	--	0.00451	--	--			
19-Jan-11	88	5.733	--	0.441	28.667	0.0309	0.2205	0.0617	0.0022	0.0265	0.0057	29.9897	34.8851	0.0109	0.00037	0.0181	0.000542	0.000004	0.000002	0.022051	0.000002	4.675	0.0003969	0.0000331	0.0001279	0.00088	0.000005	0.000441			
26-Jan-11	89	3.569	--	0.446	25.431	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4.595	--	--	--	0.00446	--	--			
2-Feb-11	90	4.569	--	--	28.431	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4.889	--	--	--	0.00508	--	--			
9-Feb-11	91	3.528	--	0.441	24.256	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4.362	--	--	--	--	--	--			
16-Feb-11	92	3.015	--	--	22.831	--	0.2154	--	--	--	--	--	23.9938	0.0097	0.00023	0.0134	0.000280	0.000004	0.000002	0.021538	0.000002	3.244	0.0002154	0.0000358	0.0001378	0.00215	0.000004	0.000302			
23-Feb-11	93	2.800	--	0.467	24.733	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3.612	--	--	--	0.00467	--	--			
2-Mar-11	94	3.015	--	0.431	24.123	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3.993	--	--	--	0.00431	--	--			
9-Mar-11	95	3.610	--	0.451	26.174	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4.075	--	--	--	0.00451	--	--			
16-Mar-11	96	2.585	--	0.431	22.400	0.0043	0.3015	0.0474	0.0022	0.0138	0.0073	27.5692	24.8123	0.0118	0.00021	0.0124	0.000314	0.000004	0.000002	0.021538	0.000002	3.730	0.0002154	0.0000258	0.0000603	0.00258	0.000004	0.000302			
23-Mar-11	97	2.585	--	--	22.400	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3.326	--	--	--	0.00431	--	--			
30-Mar-11	98	2.205	--	--	19.846	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3.136	--	--	--	0.00441	--	--			
6-Apr-11	99	1.368	--	--	21.231	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4.128	--	--	--	0.00472	--	--			
13-Apr-11	100	1.871	--	0.456	21.451	--	0.2282	--	--	--	--	--	23.6421	0.0097	0.00018	0.0110	0.000940	0.000005	0.000002	0.022821	0.000002	3.688	0.0001826	0.0000402	0.0000593	0.00274	0.000002	0.000228			
20-Apr-11	101	1.695	--	0.892	20.077	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3.453	--	--	--	0.00446	--	--			
27-Apr-11	102	1.613	--	0.436	21.359	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3.566	--	--	--	0.00436	--	--			
4-May-11	103	3.274	--	0.431	22.831	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3.373	--	--	--	0.00431	--	--			
11-May-11	104	2.406	--	0.472	24.062	0.0047	0.2359	0.0661	0.0024	0.0307	0.0042	24.5333	25.8544	0.0102	0.00021	0.0098	0.000368	0.000005	0.000002	0.023590	0.000002	3.789	0.0002359	0.0000269	0.0000566	0.00142	0.000005	0.000283			
18-May-11	105	2.441	--	0.436	21.795	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4.106	--	--	--	0.00436	--	--			
25-May-11	106	5.538	--	--	42.923	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5.631	--	--	--	0.00462	--	--			
1-Jun-11	107	2.326	--	0.431	28.000	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3.855	--	--	--	0.00431	--	--			
8-Jun-11	108	1.625	--	0.451	27.077	--	0.2708	--	--	--	--	--	30.4164	0.0146	0.00026	0.0180	0.000311	0.000005	0.000002	0.022564	0.000006	4.558	0.0002256	0.0000316	0.0000903	0.00226	0.000005	0.000316			
15-Jun-11	109	3.195	--	--	36.969	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5.021	--	--	--	0.00456	--	--			
22-Jun-11	110	1.895	--	--	28.431	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4.097	--	--	--	0.00431	--	--			
29-Jun-11	111	1.562	--	--	33.015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5.175	--	--	--	0.00446	--	--			
6-Jul-11	112	2.800	--	--	43.867	0.0047	0.2333	0.0467	0.0023	0.0369																					

Appendix G: Kinetic Data, Humidity Cell Tests

Madrid
Flotation
HC-14 Tailings

Loading Calculations																						
Date	Accum. Weeks	Mg mg/kg/wk	Mn mg/kg/wk	Hg (CVAF) mg/kg/wk	Mo mg/kg/wk	Ni mg/kg/wk	P mg/kg/wk	K mg/kg/wk	Se mg/kg/wk	Si mg/kg/wk	Ag mg/kg/wk	Na mg/kg/wk	Sr mg/kg/wk	Te mg/kg/wk	Ti mg/kg/wk	Th mg/kg/wk	Sn mg/kg/wk	Ti mg/kg/wk	U mg/kg/wk	V mg/kg/wk	Zn mg/kg/wk	Zr mg/kg/wk
13-May-09	0	10.98	0.01367	8.8205E-06	0.00617	0.01058	0.01323	4.243	0.00115	0.613	2.2051E-05	4.675	0.04366	8.8205E-05	1.3231E-05	4.4103E-05	0.00044103	8.8205E-05	4.4103E-05	0.000397	0.000441	0.000882
20-May-09	1	3.75	0.01132	9.4359E-06	0.00170	0.00420	0.01415	2.241	0.00042	0.363	2.359E-05	1.231	0.01557	9.4359E-05	9.4359E-06	4.7179E-05	0.00014154	9.4359E-05	4.7179E-05	0.000236	0.000472	0.000944
27-May-09	2	6.98	0.01808	8.4103E-06	0.00257	0.00673	0.01262	2.872	0.00055	0.484	2.1026E-05	1.648	0.02986	8.4103E-05	8.4103E-06	4.2051E-05	0.00016821	8.4103E-05	4.2051E-05	0.000210	0.000421	0.000841
3-Jun-09	3	7.48	--	--	--	--	--	2.400	--	--	--	1.246	--	--	--	--	--	--	--	--	--	--
10-Jun-09	4	7.08	0.01887	9.4359E-06	0.00208	0.00377	0.01415	2.255	0.00066	0.396	2.359E-05	1.062	0.03019	9.4359E-05	9.4359E-06	4.7179E-05	9.4359E-05	9.4359E-05	4.7179E-05	0.000189	0.000472	0.000944
17-Jun-09	5	6.76	--	--	--	--	--	1.982	--	--	--	0.905	--	--	--	--	--	--	--	--	--	--
24-Jun-09	6	10.85	--	--	--	--	--	2.458	--	--	--	1.253	--	--	--	--	--	--	--	--	--	--
1-Jul-09	7	8.68	--	--	--	--	--	1.773	--	--	--	0.933	--	--	--	--	--	--	--	--	--	--
8-Jul-09	8	6.74	0.01740	8.9231E-06	0.00201	0.00223	0.01338	1.655	0.00049	0.366	2.2308E-05	0.696	0.02543	8.9231E-05	8.9231E-06	4.4615E-05	8.9231E-05	8.9231E-05	4.4615E-05	0.000134	0.000446	0.000892
15-Jul-09	9	4.26	--	--	--	--	--	0.862	--	--	--	0.388	--	--	--	--	--	--	--	--	--	--
22-Jul-09	10	7.57	--	--	--	--	--	1.784	--	--	--	0.819	--	--	--	--	--	--	--	--	--	--
29-Jul-09	11	7.83	--	--	--	--	--	1.746	--	--	--	0.755	--	--	--	--	--	--	--	--	--	--
5-Aug-09	12	4.01	0.01315	9.7436E-06	0.00127	0.00102	0.05359	1.194	0.00034	0.278	2.4359E-05	0.468	0.01510	9.7436E-05	9.7436E-06	4.8718E-05	9.7436E-05	9.7436E-05	4.8718E-05	0.000146	0.000487	0.000974
12-Aug-09	13	7.53	--	--	--	--	--	1.689	--	--	--	0.502	--	--	--	--	--	--	--	--	--	--
19-Aug-09	14	6.02	--	--	--	--	--	1.351	--	--	--	0.567	--	--	--	--	--	--	--	--	--	--
26-Aug-09	15	5.78	--	--	--	--	--	1.367	--	--	--	0.529	--	--	--	--	--	--	--	--	--	--
2-Sep-09	16	4.97	0.00959	8.7179E-06	0.00174	0.00100	0.01308	1.199	0.00039	0.397	2.1795E-05	0.488	0.01787	8.7179E-05	8.7179E-06	4.359E-05	8.7179E-05	8.7179E-05	4.359E-05	0.000174	0.002179	0.000872
9-Sep-09	17	6.20	--	--	--	--	--	1.383	--	--	--	0.580	--	--	--	--	--	--	--	--	--	--
16-Sep-09	18	6.89	--	--	--	--	--	1.551	--	--	--	0.646	--	--	--	--	--	--	--	--	--	--
23-Sep-09	19	6.29	--	--	--	--	--	1.422	--	--	--	0.560	--	--	--	--	--	--	--	--	--	--
30-Sep-09	20	6.54	0.00523	8.7179E-06	0.00244	0.00122	0.00654	1.552	0.00035	0.689	1.7436E-05	0.580	0.01744	8.7179E-05	8.7179E-06	2.1795E-05	4.359E-05	0.00030513	2.1795E-05	0.000305	0.000436	0.000044
7-Oct-09	21	7.85	--	--	--	--	--	1.918	--	--	--	0.714	--	--	--	--	--	--	--	--	--	--
14-Oct-09	22	8.74	--	--	--	--	--	2.008	--	--	--	0.625	--	--	--	--	--	--	--	--	--	--
21-Oct-09	23	8.54	--	--	--	--	--	1.800	--	--	--	0.554	--	--	--	--	--	--	--	--	--	--
28-Oct-09	24	8.31	0.00164	9.1282E-06	0.00114	0.00105	0.00685	1.365	0.00009	1.109	1.8256E-05	0.461	0.01917	9.1282E-05	9.1282E-06	2.2821E-05	4.5641E-05	0.00022821	2.2821E-05	0.000411	0.000456	0.000046
4-Nov-09	25	7.67	--	--	--	--	--	1.367	--	--	--	0.397	--	--	--	--	--	--	--	--	--	--
11-Nov-09	26	8.03	--	--	--	--	--	1.338	--	--	--	0.369	--	--	--	--	--	--	--	--	--	--
18-Nov-09	27	7.36	--	--	--	--	--	1.093	--	--	--	0.378	--	--	--	--	--	--	--	--	--	--
25-Nov-09	28	5.61	0.00100	8.3077E-06	0.00116	0.00087	0.00623	1.163	0.00033	0.868	1.6615E-05	0.274	0.01578	8.3077E-05	8.3077E-06	2.0769E-05	4.1538E-05	0.00016615	2.0769E-05	0.000457	0.000415	0.000042
2-Dec-09	29	7.94	--	--	--	--	--	1.071	--	--	--	0.357	--	--	--	--	--	--	--	--	--	--
9-Dec-09	30	7.40	--	--	--	--	--	0.967	--	--	--	0.336	--	--	--	--	--	--	--	--	--	--
16-Dec-09	31	7.85	--	--	--	--	--	0.959	--	--	--	0.305	--	--	--	--	--	--	--	--	--	--
23-Dec-09	32	6.92	0.00071	8.8205E-06	0.00128	0.00093	0.01323	0.878	0.00026	0.926	1.7641E-05	0.300	0.01676	8.8205E-05	8.8205E-06	2.2051E-05	4.4103E-05	8.8205E-05	2.2051E-05	0.000353	0.000441	0.000044
30-Dec-09	33	7.72	--	--	--	--	--	0.838	--	--	--	0.309	--	--	--	--	--	--	--	--	--	--
6-Jan-10	34	7.06	--	--	--	--	--	0.715	--	--	--	0.294	--	--	--	--	--	--	--	--	--	--
13-Jan-10	35	8.44	--	--	--	--	--	0.858	--	--	--	0.334	--	--	--	--	--	--	--	--	--	--
20-Jan-10	36	6.83	0.00054	8.9231E-06	0.00161	0.00089	0.00669	0.723	0.00027	0.874	1.7846E-05	0.245	0.01562	8.9231E-05	8.9231E-06	2.2308E-05	4.4615E-05	8.9231E-05	2.2308E-05	0.000312	0.000446	0.000045
27-Jan-10	37	7.92	--	--	--	--	--	0.944	--	--	--	0.328	--	--	--	--	--	--	--	--	--	--
3-Feb-10	38	8.03	--	--	--	--	--	1.058	--	--	--	0.309	--	--	--	--	--	--	--	--	--	--
10-Feb-10	39	7.89	--	--	--	--	--	1.133	--	--	--	0.262	--	--	--	--	--	--	--	--	--	--
17-Feb-10	40	7.70	0.00038	8.5128E-06	0.00213	0.00089	0.00638	1.281	0.00017	0.830	1.7026E-05	0.328	0.01639	8.5128E-05	8.5128E-06	2.1282E-05	4.2564E-05	0.00012769	2.1282E-05	0.000255	0.001277	0.000043
24-Feb-10	41	8.35	--	--	--	--	--	1.461	--	--	--	0.319	--	--	--	--	--	--	--	--	--	--
3-Mar-10	42	7.58	--	--	--	--	--	1.447	--	--	--	0.341	--	--	--	--	--	--	--	--	--	--
10-Mar-10	43	8.49	--	--	--	--	--	1.689	--	--	--	0.319	--	--	--	--	--	--	--	--	--	--
17-Mar-10	44	7.37	0.00048	8.7179E-06	0.00262	0.00092	0.00654	1.656	0.00031	0.802	1.7436E-05	0.292	0.01700	8.7179E-05	8.7179E-06	2.1795E-05	4.359E-05	8.7179E-05	2.1795E-05	0.000262	0.000436	0.000044
24-Mar-10	45	8.08	--	--	--	--	--	1.689	--	--	--	0.319	--	--	--	--	--	--	--	--	--	--
31-Mar-10	46	9.66	--	--	--	--	--	2.029	--	--	--	0.309	--									

Appendix G: Kinetic Data, Humidity Cell Tests

HC-14
Madrid
Flotation
Tailings

Loading Calculations																						
Date	Accum. Weeks	Mg mg/kg/wk	Mn mg/kg/wk	Hg (CVAF) mg/kg/wk	Mo mg/kg/wk	Ni mg/kg/wk	P mg/kg/wk	K mg/kg/wk	Se mg/kg/wk	Si mg/kg/wk	Ag mg/kg/wk	Na mg/kg/wk	Sr mg/kg/wk	Te mg/kg/wk	Tl mg/kg/wk	Th mg/kg/wk	Sn mg/kg/wk	Ti mg/kg/wk	U mg/kg/wk	V mg/kg/wk	Zn mg/kg/wk	Zr mg/kg/wk
3-Nov-10	77	3.76	--	--	--	--	--	0.258	--	--	--	0.129	--	--	--	--	--	--	--	--	--	--
10-Nov-10	78	5.16	--	--	--	--	--	0.353	--	--	--	0.176	--	--	--	--	--	--	--	--	--	--
17-Nov-10	79	4.57	--	--	--	--	--	0.323	--	--	--	0.138	--	--	--	--	--	--	--	--	--	--
24-Nov-10	80	4.27	0.00243	1.2923E-06	0.00093	0.00040	0.00129	0.405	0.00006	0.258	2.1538E-06	0.138	0.00689	8.6154E-06	2.1538E-06	2.1538E-06	2.1538E-05	0.00047385	3.0154E-06	0.000215	0.000043	0.000043
1-Dec-10	81	4.52	--	--	--	--	--	0.345	--	--	--	0.129	--	--	--	--	--	--	--	--	--	--
8-Dec-10	82	4.88	--	--	--	--	--	0.365	--	--	--	0.228	--	--	--	--	--	--	--	--	--	--
15-Dec-10	83	4.74	--	--	--	--	--	0.316	--	--	--	0.090	--	--	--	--	--	--	--	--	--	--
22-Dec-10	84	4.53	0.00267	8.7179E-07	0.00083	0.00044	0.00087	0.392	0.00005	0.305	2.1795E-06	0.144	0.00676	8.7179E-06	2.6154E-06	2.1795E-06	3.0513E-05	0.00021795	1.7436E-06	0.000131	0.000044	0.000044
29-Dec-10	85	4.68	--	--	--	--	--	0.268	--	--	--	0.134	--	--	--	--	--	--	--	--	--	--
5-Jan-11	86	4.95	--	--	--	--	--	0.268	--	--	--	0.134	--	--	--	--	--	--	--	--	--	--
12-Jan-11	87	5.55	--	--	--	--	--	0.361	--	--	--	0.135	--	--	--	--	--	--	--	--	--	--
19-Jan-11	88	5.65	0.00076	8.8205E-07	0.00085	0.00035	0.00088	0.490	0.00005	0.397	2.2051E-06	0.185	0.00759	8.8205E-06	2.2051E-06	2.2051E-06	3.0872E-05	0.00022051	2.2051E-06	0.000088	0.000044	0.000044
26-Jan-11	89	5.00	--	--	--	--	--	0.357	--	--	--	0.134	--	--	--	--	--	--	--	--	--	--
2-Feb-11	90	5.33	--	--	--	--	--	0.914	--	--	--	0.558	--	--	--	--	--	--	--	--	--	--
9-Feb-11	91	4.63	--	--	--	--	--	0.265	--	--	--	0.132	--	--	--	--	--	--	--	--	--	--
16-Feb-11	92	3.86	0.00166	8.6154E-07	0.00058	0.00031	0.00086	0.327	0.00008	0.258	2.1538E-06	0.125	0.00569	8.6154E-06	1.7231E-06	2.1538E-06	2.1538E-05	0.00021538	3.8769E-06	0.000086	0.000043	0.000043
23-Feb-11	93	4.50	--	--	--	--	--	0.233	--	--	--	0.140	--	--	--	--	--	--	--	--	--	--
2-Mar-11	94	4.95	--	--	--	--	--	0.258	--	--	--	0.129	--	--	--	--	--	--	--	--	--	--
9-Mar-11	95	4.78	--	--	--	--	--	0.316	--	--	--	0.135	--	--	--	--	--	--	--	--	--	--
16-Mar-11	96	3.76	0.00133	8.6154E-07	0.00040	0.00037	0.00129	0.323	0.00004	0.258	2.1538E-06	0.129	0.00603	8.6154E-06	2.5846E-06	2.1538E-06	1.7231E-05	0.00021538	1.7231E-06	0.000129	0.000043	0.000043
23-Mar-11	97	3.53	--	--	--	--	--	0.215	--	--	--	0.043	--	--	--	--	--	--	--	--	--	--
30-Mar-11	98	3.37	--	--	--	--	--	0.265	--	--	--	0.132	--	--	--	--	--	--	--	--	--	--
6-Apr-11	99	3.45	--	--	--	--	--	0.330	--	--	--	0.189	--	--	--	--	--	--	--	--	--	--
13-Apr-11	100	3.51	0.00257	9.1282E-07	0.00042	0.00040	0.00502	0.310	0.00004	0.274	2.2821E-06	0.132	0.01931	9.1282E-06	9.1282E-07	2.2821E-06	3.6513E-05	0.00022821	3.1949E-06	0.000091	0.000091	0.000046
20-Apr-11	101	3.50	--	--	--	--	--	0.312	--	--	--	0.089	--	--	--	--	--	--	--	--	--	--
27-Apr-11	102	3.79	--	--	--	--	--	0.218	--	--	--	0.131	--	--	--	--	--	--	--	--	--	--
4-May-11	103	4.01	--	--	--	--	--	0.258	--	--	--	0.258	--	--	--	--	--	--	--	--	--	--
11-May-11	104	3.98	0.00146	9.4359E-07	0.00044	0.00033	0.00472	0.307	0.00004	0.283	2.359E-06	0.137	0.00646	9.4359E-06	2.8308E-06	2.359E-06	6.1333E-05	0.0002359	4.2462E-06	0.000094	0.000377	0.000047
18-May-11	105	4.49	--	--	--	--	--	0.262	--	--	--	0.174	--	--	--	--	--	--	--	--	--	--
25-May-11	106	9.23	--	--	--	--	--	0.415	--	--	--	0.231	--	--	--	--	--	--	--	--	--	--
1-Jun-11	107	5.43	--	--	--	--	--	0.431	--	--	--	0.129	--	--	--	--	--	--	--	--	--	--
8-Jun-11	108	4.65	0.00048	9.0256E-07	0.00043	0.00037	0.00677	0.338	0.00004	0.316	2.2564E-06	0.140	0.00722	9.0256E-06	1.8051E-06	2.2564E-06	4.0615E-05	0.00022564	8.5744E-06	0.000090	0.001579	0.000090
15-Jun-11	109	6.94	--	--	--	--	--	0.365	--	--	--	0.183	--	--	--	--	--	--	--	--	--	--
22-Jun-11	110	5.21	--	--	--	--	--	0.388	--	--	--	0.172	--	--	--	--	--	--	--	--	--	--
29-Jun-11	111	6.47	--	--	--	--	--	0.491	--	--	--	0.178	--	--	--	--	--	--	--	--	--	--
6-Jul-11	112	7.75	0.00009	9.3333E-07	0.00061	0.00048	0.00093	0.541	0.00009	0.607	2.3333E-06	0.210	0.00989	9.3333E-06	3.7333E-06	2.3333E-06	3.7333E-05	0.00023333	3.7333E-06	0.000093	0.000187	0.000047
13-Jul-11	113	7.54	--	--	--	--	--	0.451	--	--	--	0.181	--	--	--	--	--	--	--	--	--	--
20-Jul-11	114	5.82	--	--	--	--	--	0.302	--	--	--	0.129	--	--	--	--	--	--	--	--	--	--
27-Jul-11	115	9.17	--	--	--	--	--	0.547	--	--	--	0.252	--	--	--	--	--	--	--	--	--	--
3-Aug-11	116	10.20	0.00009	9.9487E-07	0.00061	0.00053	0.00647	0.667	0.00027	0.746	5.9692E-06	0.244	0.01055	9.9487E-06	4.9744E-06	2.4872E-06	4.9744E-05	0.00024872	5.4718E-06	0.000149	0.000448	0.000050
10-Aug-11	117	8.83	--	--	--	--	--	0.517	--	--	--	0.258	--	--	--	--	--	--	--	--	--	--
17-Aug-11	118	7.63	--	--	--	--	--	0.477	--	--	--	0.048	--	--	--	--	--	--	--	--	--	--
24-Aug-11	119	6.90	--	--	--	--	--	0.226	--	--	--	0.090	--	--	--	--	--	--	--	--	--	--
31-Aug-11	120	2.94	0.00109	8.6154E-07	0.00010	0.00034	0.00345	0.224	0.00003	0.258	2.1538E-06	0.060	0.00551	8.6154E-06	1.2923E-06	2.1538E-06	2.1538E-05	0.00021538	1.7231E-06	0.000086	0.000345	0.000043
7-Sep-11	121	3.52	--	--	--	--	--	0.215	--	--	--	0.043	--	--	--	--	--	--	--	--	--	--
14-Sep-11	122	3.90	--	--	--	--	--	0.223	--	--	--	0.045	--	--	--	--	--	--	--	--	--	--
21-Sep-11	123	4.26	--	--	--	--	--	0.221	--	--	--	0.044	--	--	--	--	--	--	--	--	--	--
28-Sep-11	124	3.57	0.00137	3.0154E-06	0.00020	0.00041	0.00517	0.241	0.00005	0.258	2.1538E-06	0.086	0.00844	8.6154E-06	1.2923E-06	2.1538E-06	3.0154E-05	0.00021538	1.2923E-06	0.000086	0.003360	0.000043
5-Oct-11	125	5.60	--	--	--	--	--	0.135	--	--	--	0.135	--	--	--	--	--	--	--	--	--	--
12-Oct-11	126	5.75	--	--	--	--	--	0.228	--	--	--	0.091	--	--	--	--	--	--	--	--	--	--
19-Oct-11	127	5.38	--	--	--	--	--	0.215	--	--	--	0.086	--	--	--	--	--	--	--	--</		

Appendix G: Kinetic Data, Humidity Cell Tests

Boston Flotation HC-13 Tailings		Concentrations																																
Date	Accum. Weeks	Volume (ml)		pH (pH Units)	EC (µS/cm)	ORP (mV)	SO4 (mg/L)	Acidity to pH 4.5	Acidity to pH 8.3	Alkalinity to pH 4.5	Fluoride (mg/L)	Chloride (mg/L)	Nitrate-N (mg/L)	Nitrite-N (mg/L)	Total Ammonia (mgN/L)	Diss.-P (mgP/L)	TDS (mg/L)	Hardness CaCO3 (mg/L)	Al (mg/L)	Sb (mg/L)	As (mg/L)	Ba (mg/L)	Be (mg/L)	Bi (mg/L)	B (mg/L)	Cd (mg/L)	Ca (mg/L)	Cr (mg/L)	Co (mg/L)	Cu (mg/L)	Fe (mg/L)	Pb (mg/L)	Li (mg/L)	
		mg	CaCO3/L																															
		Input	Output	0.01	1	50	1	1	1	0.1	0.2	0.02	0.002	0.01	0.001	10	0.02	0.005	0.001	0.001	0.001	0.001	0.001	0.001	0.05	0.0002	0.05	0.001	0.001	0.001	0.001	0.05	0.001	0.001
13-May-09	0	750	375	8.18	692	160	314	--	1	75	0.47	13.6	0.05	0.038	0.16	0.02	545	357	0.011	0.004	0.045	0.015	0.0002	0.0002	0.1	0.00004	70.8	0.0002	0.0021	0.0038	0.01	0.0002	0.0052	
20-May-09	1	500	430	8.13	772	160	354	--	2	144	0.28	3.67	0.05	0.009	0.07	0.02	609	470	0.004	0.0033	0.03	0.012	0.0002	0.0002	0.08	0.00004	81	0.0002	0.0053	0.0031	0.01	0.0002	0.0051	
27-May-09	2	500	440	8.32	681	110	190	--	--	190	0.29	0.82	0.05	0.003	0.02	0.02	528	410	0.002	0.0023	0.018	0.01	0.0002	0.0002	0.07	0.00004	74.5	0.0002	0.0059	0.0008	0.01	0.0002	0.0049	
3-Jun-09	3	500	440	8.12	560	120	146	--	2	182	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	57.2	--	--	--	0.01	--	--	
10-Jun-09	4	500	475	8.43	434	115	91	--	--	148	0.17	0.39	0.05	0.002	0.04	0.02	278	240	0.004	0.0015	0.012	0.0045	0.0002	0.0002	0.04	0.00004	40.2	0.0002	0.0025	0.0022	0.01	0.0002	0.0032	
17-Jun-09	5	500	430	8.27	348	120	59	--	1	137	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	36.5	--	--	--	0.01	--	--	
24-Jun-09	6	500	490	8.32	312	125	34	--	--	136	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	30.2	--	--	--	0.01	--	--	
1-Jul-09	7	500	475	8.38	275	120	12	--	--	127	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	25.2	--	--	--	0.01	--	--	
8-Jul-09	8	500	430	8.36	235	120	11	--	--	121	0.11	0.2	0.05	0.002	0.17	0.12	145	125	0.004	0.0013	0.011	0.0026	0.0002	0.0002	0.04	0.00004	20.9	0.0002	0.0008	0.0002	0.01	0.0002	0.002	
15-Jul-09	9	500	435	8.29	217	140	6	--	1	112	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	20.7	--	--	--	0.01	--	--	
22-Jul-09	10	500	500	8.3	225	150	6	--	--	117	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	20.3	--	--	--	0.01	--	--	
29-Jul-09	11	500	460	8.35	231	145	5	--	--	120	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	21.1	--	--	--	0.01	--	--	
5-Aug-09	12	500	460	8.31	288	160	5	--	--	117	0.05	0.2	0.05	0.002	0.26	0.02	122	114	0.004	0.0011	0.011	0.0025	0.0002	0.0002	0.03	0.00004	17.9	0.0003	0.0006	0.0007	0.01	0.0002	0.0016	
12-Aug-09	13	500	485	8.3	209	125	5	--	--	112	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	18.3	--	--	--	0.01	--	--	
19-Aug-09	14	500	435	8.32	204	140	4	--	--	107	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	18.8	--	--	--	0.01	--	--	
26-Aug-09	15	500	430	8.33	205	150	3	--	--	106	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	17.5	--	--	--	0.01	--	--	
2-Sep-09	16	500	440	8.32	207	150	2	--	--	106	0.1	0.4	0.1	0.002	0.41	0.02	49	99.8	0.004	0.0008	0.0084	0.0023	0.0002	0.0002	0.02	0.00004	15.6	0.0002	0.0004	0.001	0.01	0.0002	0.0011	
9-Sep-09	17	500	445	8.38	205	145	3	--	--	107	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	17.7	--	--	--	0.01	--	--	
16-Sep-09	18	500	455	8.42	198	135	1	--	--	106	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	17.6	--	--	--	0.01	--	--	
23-Sep-09	19	500	420	8.4	197	150	1	--	--	106	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	17.4	--	--	--	0.01	--	--	
30-Sep-09	20	500	435	8.38	195	150	3	--	--	105	0.05	0.2	0.05	0.002	0.45	0.02	107	112	0.006	0.0008	0.0097	0.0025	0.0001	0.0001	0.026	0.00001	16.8	0.0005	0.0004	0.0009	0.01	0.00005	0.0016	
7-Oct-09	21	500	445	8.34	203	190	3	--	--	107	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	16.9	--	--	--	0.01	--	--	
14-Oct-09	22	500	445	8.36	200	150	3	--	--	106	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	17.3	--	--	--	0.01	--	--	
21-Oct-09	23	500	475	8.31	215	140	2	--	--	112	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	17.7	--	--	--	0.01	--	--	
28-Oct-09	24	500	440	8.32	201	155	2	--	--	108	0.05	0.2	0.05	0.002	0.4	0.02	108	123	0.006	0.0007	0.0073	0.0019	0.0001	0.0001	0.028	0.00001	16.8	0.0002	0.0003	0.0031	0.01	0.00005	0.0021	
4-Nov-09	25	500	420	8.35	193	150	2	--	--	103	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	17.4	--	--	--	0.01	--	--	
11-Nov-09	26	500	485	8.34	186	140	1	--	--	100	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	16.9	--	--	--	0.01	--	--	
18-Nov-09	27	500	425	8.39	195	140	1	--	--	100	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	16.8	--	--	--	0.01	--	--	
25-Nov-09	28	500	420	8.37	188	140	1	--	--	103	0.05	0.2	0.05	0.002	0.33	0.02	112	100	0.005	0.0006	0.0074	0.0019	0.0001	0.0001	0.015	0.00001	18.7	0.0002	0.0003	0.0005	0.01	0.00005	0.0007	
2-Dec-09	29	500	430	8.27	199	140	3	--	1	105	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	17.6</							

Appendix G: Kinetic Data, Humidity Cell Tests

HC-13 Boston Flotation Tailings

Concentrations																																	
Date	Accum. Weeks	Volume (ml)		pH (pH Units)	EC (µS/cm)	ORP (mV)	SO4 (mg/L)	Acidity to pH 4.5	Acidity to pH 8.3	Alkalinity to pH 4.5	Fluoride (mg/L)	Chloride (mg/L)	Nitrate-N (mg/L)	Nitrite-N (mg/L)	Total Ammonia (mgN/L)	Diss.-P (mgP/L)	TDS (mg/L)	Hardness CaCO3 (mg/L)	Al (mg/L)	Sb (mg/L)	As (mg/L)	Ba (mg/L)	Be (mg/L)	Bi (mg/L)	B (mg/L)	Cd (mg/L)	Ca (mg/L)	Cr (mg/L)	Co (mg/L)	Cu (mg/L)	Fe (mg/L)	Pb (mg/L)	Li (mg/L)
		Input	Output					mg CaCO3/L																									
1-Dec-10	81	500	5	0.01	1	50	1	1	1	1	0.1	0.2	0.02	0.002	0.01	0.001	10	0.02	0.005	0.001	0.001	0.001	0.001	0.001	0.05	0.0002	0.05	0.001	0.001	0.001	0.05	0.001	0.001
8-Dec-10	82	500	430	8.31	190	130	2	--	--	92	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	14.2	--	--	--	0.01	--	--
15-Dec-10	83	500	470	8.3	197	130	2	--	--	95	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	15.2	--	--	--	0.01	--	--
22-Dec-10	84	500	440	8.32	197	120	2	--	--	93	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	14.5	--	--	--	0.01	--	--
29-Dec-10	85	500	435	8.31	190	130	2	--	--	94	--	0.8	--	--	--	--	--	95.9	0.0027	0.00017	0.00122	0.00088	0.00001	0.000005	0.05	0.000005	14.9	0.0009	3E-05	0.00021	0.002	0.000017	0.0005
5-Jan-11	86	500	455	8.31	193	125	3	--	--	97	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	15.5	--	--	--	0.01	--	--
12-Jan-11	87	500	435	8.36	187	130	3	--	--	97	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	16	--	--	--	0.01	--	--
19-Jan-11	88	500	455	8.3	194	115	2	--	--	93	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	15.7	--	--	--	0.01	--	--
26-Jan-11	89	500	420	8.36	192	140	3	--	--	91	0.04	0.5	0.02	0.005	0.05	0.005	98	93.5	0.0022	0.00017	0.00101	0.00084	0.00001	0.000005	0.05	0.000005	14.5	0.001	2E-05	0.00028	0.001	0.000013	0.0005
2-Feb-11	90	500	440	8.31	199	120	3	--	--	94	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	16	--	--	--	0.01	--	--
9-Feb-11	91	500	420	8.32	191	155	3	--	--	95	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	15.5	--	--	--	0.01	--	--
16-Feb-11	92	500	440	8.3	190	140	3	--	--	97	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	15.9	--	--	--	0.01	--	--
23-Feb-11	93	500	450	8.32	193	125	2	--	--	89	--	0.5	--	--	--	--	--	90.3	0.0032	0.00017	0.00122	0.00082	0.00001	0.000005	0.05	0.000005	12.7	0.0009	5E-05	0.00029	0.003	0.000015	0.0005
2-Mar-11	94	500	470	8.31	186	115	2	--	--	93	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	15.2	--	--	--	0.01	--	--
9-Mar-11	95	500	440	8.31	182	120	2	--	--	93	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	16	--	--	--	0.01	--	--
16-Mar-11	96	500	425	8.26	193	110	3	--	--	90	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	15	--	--	--	0.01	--	--
23-Mar-11	97	500	440	8.3	187	140	2	--	--	92	0.01	0.6	0.05	0.005	0.052	0.021	100	93.5	0.004	0.00016	0.00086	0.00088	0.00001	0.000005	0.05	0.000005	14.4	0.0007	2E-05	0.00009	0.001	0.000005	0.0005
30-Mar-11	98	500	430	8.36	185	130	2	--	--	89	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	13.7	--	--	--	0.01	--	--
6-Apr-11	99	500	420	8.34	177	130	2	--	--	88	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	13.5	--	--	--	0.01	--	--
13-Apr-11	100	500	475	8.34	182	90	0.5	--	--	92	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	15.3	--	--	--	0.01	--	--
20-Apr-11	101	500	440	8.32	195	90	1.6	--	--	92	--	0.5	--	--	--	--	--	91.2	0.0031	0.00015	0.0009	0.00074	0.00001	0.000005	0.05	0.000005	14.4	0.0006	2E-05	0.00008	0.001	0.000005	0.0005
27-Apr-11	102	500	465	8.36	190	120	1.7	--	--	93	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	15	--	--	--	0.01	--	--
4-May-11	103	500	425	8.3	190	150	1.2	--	--	93	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	15.3	--	--	--	0.01	--	--
11-May-11	104	500	440	8.25	200	120	3.2	--	--	100	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	15	--	--	--	0.01	--	--
18-May-11	105	500	445	8.28	210	120	1.5	--	--	99	0.01	0.5	0.04	0.005	0.11	0.006	88	100	0.0021	0.00015	0.0008	0.00081	0.00001	0.000005	0.05	0.000006	14.7	0.0006	9E-06	0.00014	0.001	0.000005	0.0005
25-May-11	106	500	430	8.33	197	155	1.4	--	--	99	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	15.2	--	--	--	0.01	--	--
1-Jun-11	107	500	485	8.33	213	170	1.9	--	--	107	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	17.2	--	--	--	0.01	--	--
8-Jun-11	108	500	440	8.31	198	100	3.3	--	--	97	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	15.6	--	--	--	0.01	--	--
15-Jun-11	109	500	420	8.36	199	155	1	--	--	97	--	0.5	--	--	--	--	--	101	0.0037	0.00016	0.00086	0.00091	0.00001	0.000005	0.05	0.000008	14.5	0.0005	1E-05	0.0001	0.002	0.000014	0.0005
22-Jun-11	110	500	465	8.39	206	140	6.1	--	--	102	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	15.7	--	--	--	0.01	--	--
29-Jun-11	111	500	425	8.44	175	135	2.1	--	--	89	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	14.3	--	--	--	0.01	--	--
6-Jul-11	112	500	475	8.34	182	90	0.5	--	--	92	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	16.3	--	--	--	0.01	--	--
13-Jul-11	113	500	420	8.35	193	120	0.5	--	--	93	0.01	0.5	0.05	0.005	0.083	0.005	110	107	0.0051	0.00015	0.00065	0.00078	0.00001	0.000005	0.05	0.000005	16.9	0.0005	1E-05	0.00016	0.003	0.000026	0.0005
20-Jul-11	114	500	480	8.3	203	130	1.6	--	--	100	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	13.4	--	--	--	0.01	--	--
27-Jul-11	115	500	430	8.3	162	150	1.2	--	--	82	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	13.3	--	--	--	0.01	--	--
3-Aug-11	116	500	440	8.33	174	155	1.5	--	--	83	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	13.3	--	--	--	0.01	--	--
10-Aug-11	117	500	425	8.3	164	145	1.3	--	--	90	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	15.3	--	--	--	0.01	--	--
17-Aug-11	118	500	445	8.3	184	130	1.5	--	--	88	--	1	--	--	--	--	--	95	0.0034	0.00013	0.00088	0.00086	0.00001	0.000005	0.05	0.000005	14.3	0.0006	1E-05	0.00011	0.002	0.000012	0.0005
24-Aug-11	119	500	450	8.39	189	130	1.5	--	--	89	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	14.3	--	--	--	0.01	--	--
31-Aug-11	120	500	440	8.31	194	155	1.7	--	--	90	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	12.8	--	--	--	0.01	--	--
7-Sep-11	121	500	445	8.34	193	120	2.8	--	--	97	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	15.7	--	--	--	0.01	--	--
14-Sep-11	122	500	485	8.31	188	140	1.4	--	--	89	0.01	0.5	0.06	0.005	0.054	0.006	94	88	0.0027	0.00014	0.00064	0.00069	0.00001	0.000005	0.05	0.00001	13.6	0.0004	1E-05	0.00016	0.001	0.000018	0.0005
21-Sep-11	123	500	435	8.32	180	130	3.3	--	--	92	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	14.8	--	--	--	0.01	--	--
28-Sep-11	124	500	445	8.3	200	155	2.1	--	--	99	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	16.6	--	--	--	0.01	--	--
5-Oct-11	125	500	450	8.22	200	135	1.7	--	--	102	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	16.9	--	--	--	0.01	--	--
12-Oct-11	126	500	435	8.3	217	135	0.5	--	--	102	--	0.5	--	--	--	--	--	105	0.0067	0.00013	0.00063	0.00099	0.00001	0.000005	0.05	0.000077	15.3	0.0004	3E-05	0.0001	0.001	0.000021	0.0006
19-Oct-11	127	500	435	8.31	202	160	2.3	--	--	88	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	14.7	--	--	--	0.01	--	--
26-Oct-11	128	500	425	8.3	205	190	5.3	--	--	89	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	15.6	--	--	--	0.01	--	--
2-Nov-11	129	500	435	8.25	228	190	1.4	--	--	101	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	16.5	--	--	--	0.01	--	--
9-Nov-11	130	500	445	8.3	206	220	0.71	--	--	102	0.01	1.1	0.07	0.005	0.043	0.009	100	102	0.0044	0.00013	0.00063	0.00093	0.00001	0.000005	0.05	0.00001	15.4	0.0004	2E-05	0.00012	0.003	0.000039	0.0005
16-Nov-11	131	500	420	8.2	227</																												

Appendix G: Kinetic Data, Humidity Cell Tests

Boston
Flotation
HC-13 Tailings

Date	Accum. Weeks	Concentrations																					
		Mg (mg/L)	Mn (mg/L)	Hg (mg/L)	Mo (mg/L)	Ni (mg/L)	P (mg/L)	K (mg/L)	Se (mg/L)	Si (mg/L)	Ag (mg/L)	Na (mg/L)	Sr (mg/L)	Te (mg/L)	Tl (mg/L)	Th (mg/L)	Sn (mg/L)	Ti (mg/L)	U (mg/L)	V (mg/L)	Zn (mg/L)	Zr (mg/L)	
		0.05	0.001	0.000002	0.0005	0.001	0.15	0.1	0.001	0.25	0.00025	0.05	0.001	0.001	0.0001	0.0005	0.001	0.0001	0.0005	0.001	0.005	0.01	
13-May-09	0	43.7	0.049	0.00002	0.333	0.019	0.03	4.05	0.0075	0.95	0.00023	17.1	0.236	0.0002	0.00002	0.00002	0.0001	0.0009	0.0002	0.0001	0.0002	0.002	
20-May-09	1	64.9	0.081	0.00002	0.181	0.038	0.03	3.55	0.0093	1.2	0.00005	7.45	0.235	0.0002	0.00002	0.0001	0.0003	0.0002	0.0001	0.0002	0.001		
27-May-09	2	65.5	0.074	0.00002	0.087	0.037	0.03	2.61	0.0085	1.09	0.00005	2.6	0.204	0.0002	0.00002	0.0001	0.0002	0.0002	0.0001	0.0002	0.001		
3-Jun-09	3	49.2	--	--	--	--	--	1.7	--	--	--	1.3	--	--	--	--	--	--	--	--	--		
10-Jun-09	4	33.9	0.039	0.00002	0.051	0.012	0.03	1.62	0.0047	0.8	0.00005	0.83	0.115	0.0002	0.00002	0.0001	0.0003	0.0002	0.0001	0.0002	0.001		
17-Jun-09	5	32.3	--	--	--	--	--	1.4	--	--	--	0.7	--	--	--	--	--	--	--	--	--		
24-Jun-09	6	26.5	--	--	--	--	--	1	--	--	--	0.5	--	--	--	--	--	--	--	--	--		
1-Jul-09	7	21.3	--	--	--	--	--	0.9	--	--	--	0.5	--	--	--	--	--	--	--	--	--		
8-Jul-09	8	17.8	0.021	0.00002	0.028	0.0036	0.03	1.15	0.001	0.64	0.00005	0.36	0.054	0.0002	0.00002	0.0001	0.0002	0.0002	0.0001	0.0002	0.001		
15-Jul-09	9	18.8	--	--	--	--	--	1	--	--	--	0.4	--	--	--	--	--	--	--	--	--		
22-Jul-09	10	19.4	--	--	--	--	--	1	--	--	--	0.4	--	--	--	--	--	--	--	--	--		
29-Jul-09	11	19.8	--	--	--	--	--	1	--	--	--	0.3	--	--	--	--	--	--	--	--	--		
5-Aug-09	12	16.9	0.018	0.00002	0.015	0.0025	0.07	0.9	0.001	0.56	0.00005	0.34	0.044	0.0002	0.00002	0.0001	0.0002	0.0002	0.0001	0.0002	0.001		
12-Aug-09	13	17.5	--	--	--	--	--	0.8	--	--	--	0.1	--	--	--	--	--	--	--	--	--		
19-Aug-09	14	18.1	--	--	--	--	--	0.8	--	--	--	0.3	--	--	--	--	--	--	--	--	--		
26-Aug-09	15	17	--	--	--	--	--	1	--	--	--	0.3	--	--	--	--	--	--	--	--	--		
2-Sep-09	16	14.7	0.014	0.00002	0.008	0.0016	0.03	0.87	0.001	0.57	0.00005	0.26	0.042	0.0002	0.00002	0.0001	0.0002	0.0002	0.0001	0.0002	0.002		
9-Sep-09	17	17.8	--	--	--	--	--	0.8	--	--	--	0.3	--	--	--	--	--	--	--	--	--		
16-Sep-09	18	17.1	--	--	--	--	--	0.8	--	--	--	0.2	--	--	--	--	--	--	--	--	--		
23-Sep-09	19	17.7	--	--	--	--	--	0.7	--	--	--	0.2	--	--	--	--	--	--	--	--	--		
30-Sep-09	20	16.9	0.012	0.00002	0.0071	0.0014	0.04	0.78	0.0007	0.57	0.00004	0.25	0.038	0.0002	0.00002	0.00005	0.0001	0.0002	0.00005	0.0001	0.001		
7-Oct-09	21	17.2	--	--	--	--	--	0.8	--	--	--	0.2	--	--	--	--	--	--	--	--	--		
14-Oct-09	22	17.5	--	--	--	--	--	0.7	--	--	--	0.2	--	--	--	--	--	--	--	--	--		
21-Oct-09	23	17.4	--	--	--	--	--	0.7	--	--	--	0.2	--	--	--	--	--	--	--	--	--		
28-Oct-09	24	19.8	0.0095	0.00002	0.0055	0.0011	0.015	0.65	0.0002	0.63	0.00004	0.24	0.037	0.0002	0.00002	0.00005	0.0001	0.0002	0.00005	0.0001	0.001		
4-Nov-09	25	17	--	--	--	--	--	0.6	--	--	--	0.2	--	--	--	--	--	--	--	--	--		
11-Nov-09	26	16.7	--	--	--	--	--	0.6	--	--	--	0.2	--	--	--	--	--	--	--	--	--		
18-Nov-09	27	17	--	--	--	--	--	0.5	--	--	--	0.2	--	--	--	--	--	--	--	--	--		
25-Nov-09	28	13	0.0059	0.00002	0.0046	0.0011	0.015	0.67	0.0006	0.47	0.00004	0.17	0.033	0.0002	0.00002	0.00005	0.0001	0.0002	0.00005	0.0001	0.001		
2-Dec-09	29	18.1	--	--	--	--	--	0.5	--	--	--	0.2	--	--	--	--	--	--	--	--	--		
9-Dec-09	30	17	--	--	--	--	--	0.5	--	--	--	0.2	--	--	--	--	--	--	--	--	--		
16-Dec-09	31	17	--	--	--	--	--	0.6	--	--	--	0.2	--	--	--	--	--	--	--	--	--		
23-Dec-09	32	14.8	0.0052	0.00002	0.0033	0.0012	0.04	0.55	0.0004	0.51	0.00004	0.2	0.031	0.0002	0.00002	0.00005	0.0001	0.0002	0.00005	0.0001	0.003		
30-Dec-09	33	17.5	--	--	--	--	--	0.5	--	--	--	0.2	--	--	--	--	--	--	--	--	--		
6-Jan-10	34	16.4	--	--	--	--	--	0.4	--	--	--	0.2	--	--	--	--	--	--	--	--	--		
13-Jan-10	35	17.1	--	--	--	--	--	0.4	--	--	--	0.2	--	--	--	--	--	--	--	--	--		
20-Jan-10	36	15.3	0.0041	0.00002	0.0031	0.0008	0.015	0.44	0.0004	0.49	0.00004	0.16	0.029	0.0002	0.00002	0.00005	0.0001	0.0002	0.00005	0.0001	0.001		
27-Jan-10	37	16.8	--	--	--	--	--	0.4	--	--	--	0.2	--	--	--	--	--	--	--	--	--		
3-Feb-10	38	17.4	--	--	--	--	--	0.4	--	--	--	0.2	--	--	--	--	--	--	--	--	--		
10-Feb-10	39	17.6	--	--	--	--	--	0.4	--	--	--	0.1	--	--	--	--	--	--	--	--	--		
17-Feb-10	40	16.9	0.0026	0.00002	0.0027	0.0008	0.015	0.46	0.0004	0.55	0.00004	0.19	0.0289	0.0002	0.00002	0.00005	0.0001	0.0002	0.00005	0.0001	0.002		
24-Feb-10	41	16.8	--	--	--	--	--	0.25	--	--	--	0.1	--	--	--	--	--	--	--	--	--		
3-Mar-10	42	15.8	--	--	--	--	--	0.4	--	--	--	0.2	--	--	--	--	--	--	--	--	--		
10-Mar-10	43	16.9	--	--	--	--	--	0.3	--	--	--	0.2	--	--	--	--	--	--	--	--	--		
17-Mar-10	44	15.2	0.002	0.00002	0.0025	0.0005	0.015	0.42	0.0005	0.55	0.00004	0.17	0.027	0.0002	0.00002	0.00005	0.0001	0.0002	0.00005	0.0001	0.001		
24-Mar-10	45	15.6	--	--	--	--	--	0.3	--	--	--	0.2	--	--	--	--	--	--	--	--	--		
31-Mar-10	46	17.1	--	--	--	--	--	0.4	--	--	--	0.1	--	--	--	--	--	--	--	--	--		
7-Apr-10	47	16.1	--	--	--	--	--	0.3	--	--	--	0.2	--	--	--	--	--	--	--	--	--		
14-Apr-10	48	16	0.001	0.00002	0.003	0.001	0.01	0.39	0.0003	0.584	0.00002	0.18	0.026	0.001	0.000009	0.001	0.00012	0.005	0.0001	0.0002	0.005		
21-Apr-10	49	15.7	--	--	--	--	--	0.3	--	--	--	0.2	--	--	--	--	--	--	--	--	--		
28-Apr-10	50	16	--	--	--	--	--	0.4	--	--	--	0.2	--	--	--	--	--	--	--	--	--		
5-May-10	51	16.5	--	--	--	--	--	0.4	--	--	--	0.4	--	--	--	--	--	--	--	--	--		
12-May-10	52	16	0.0011	0.00002	0.00251	0.00081	0.002	0.36	0.0003	0.6	0.000005	0.16	0.0266	0.00002	0.000007	0.000005	0.00015	0.0005	0.000004	0.0002	0.0001		
19-May-10	53	16.8	--	--	--	--	--	0.3	--	--	--	0.2	--	--	--	--	--	--	--	--	--		
26-May-10	54	14.5	--	--	--	--																	

Appendix G: Kinetic Data, Humidity Cell Tests

Boston
Flotation
HC-13 Tailings

Concentrations																						
Date	Accum. Weeks	Mg (mg/L)	Mn (mg/L)	Hg (mg/L)	Mo (mg/L)	Ni (mg/L)	P (mg/L)	K (mg/L)	Se (mg/L)	Si (mg/L)	Ag (mg/L)	Na (mg/L)	Sr (mg/L)	Te (mg/L)	Tl (mg/L)	Th (mg/L)	Sn (mg/L)	Ti (mg/L)	U (mg/L)	V (mg/L)	Zn (mg/L)	Zr (mg/L)
		0.05	0.001	0.000002	0.0005	0.001	0.15	0.1	0.001	0.25	0.00025	0.05	0.001	0.001	0.0001	0.0005	0.001	0.001	0.0005	0.001	0.005	0.01
1-Dec-10	81	14.3	--	--	--	--	--	0.3	--	--	--	0.1	--	--	--	--	--	--	--	--	--	--
8-Dec-10	82	15.6	--	--	--	--	--	0.3	--	--	--	0.3	--	--	--	--	--	--	--	--	--	--
15-Dec-10	83	14.7	--	--	--	--	--	0.3	--	--	--	0.1	--	--	--	--	--	--	--	--	--	--
22-Dec-10	84	14.3	0.00017	0.000002	0.00119	0.00039	0.002	0.25	0.00013	0.5	0.000005	0.13	0.0171	0.00002	0.000002	0.000005	0.00013	0.0005	0.000025	0.0002	0.0004	0.0001
29-Dec-10	85	16	--	--	--	--	--	0.3	--	--	--	0.1	--	--	--	--	--	--	--	--	--	--
5-Jan-11	86	16.3	--	--	--	--	--	0.3	--	--	--	0.1	--	--	--	--	--	--	--	--	--	--
12-Jan-11	87	15.7	--	--	--	--	--	0.3	--	--	--	0.1	--	--	--	--	--	--	--	--	--	--
19-Jan-11	88	13.9	0.00014	0.000002	0.00129	0.00031	0.002	0.18	0.0001	0.5	0.000005	0.08	0.0168	0.00002	0.000002	0.000005	0.00016	0.0005	0.000008	0.0002	0.0001	0.0001
26-Jan-11	89	16.4	--	--	--	--	--	0.3	--	--	--	0.1	--	--	--	--	--	--	--	--	--	--
2-Feb-11	90	16.2	--	--	--	--	--	0.5	--	--	--	0.3	--	--	--	--	--	--	--	--	--	--
9-Feb-11	91	16.4	--	--	--	--	--	0.3	--	--	--	0.1	--	--	--	--	--	--	--	--	--	--
16-Feb-11	92	14.2	0.00035	0.000002	0.00133	0.00047	0.002	0.17	0.00022	0.5	0.000005	0.09	0.0158	0.00002	0.000002	0.000005	0.00024	0.0005	0.000019	0.0002	0.0002	0.0001
23-Feb-11	93	15.3	--	--	--	--	--	0.3	--	--	--	0.1	--	--	--	--	--	--	--	--	--	--
2-Mar-11	94	16.1	--	--	--	--	--	0.3	--	--	--	0.1	--	--	--	--	--	--	--	--	--	--
9-Mar-11	95	15.5	--	--	--	--	--	0.3	--	--	--	0.1	--	--	--	--	--	--	--	--	--	--
16-Mar-11	96	14	0.0001	0.000002	0.00111	0.00026	0.003	0.16	0.00013	0.5	0.000006	0.08	0.0151	0.00002	0.000003	0.000005	0.0002	0.0005	0.000006	0.0002	0.0002	0.0001
23-Mar-11	97	13.7	--	--	--	--	--	0.3	--	--	--	0.1	--	--	--	--	--	--	--	--	--	--
30-Mar-11	98	14.4	--	--	--	--	--	0.3	--	--	--	0.1	--	--	--	--	--	--	--	--	--	--
6-Apr-11	99	15.8	--	--	--	--	--	0.3	--	--	--	0.2	--	--	--	--	--	--	--	--	--	--
13-Apr-11	100	13.4	0.00017	0.000002	0.00126	0.00029	0.011	0.15	0.0001	0.5	0.000005	0.08	0.0162	0.00002	0.000002	0.000005	0.00019	0.0005	0.000017	0.0002	0.0001	0.0001
20-Apr-11	101	15.4	--	--	--	--	--	0.4	--	--	--	0.1	--	--	--	--	--	--	--	--	--	--
27-Apr-11	102	15.4	--	--	--	--	--	0.3	--	--	--	0.1	--	--	--	--	--	--	--	--	--	--
4-May-11	103	15.6	--	--	--	--	--	0.3	--	--	--	0.4	--	--	--	--	--	--	--	--	--	--
11-May-11	104	15.5	0.00012	0.000002	0.001	0.0003	0.009	0.16	0.00009	0.6	0.000005	0.08	0.0144	0.00002	0.000004	0.000005	0.00033	0.0005	0.000006	0.0002	0.0004	0.0001
18-May-11	105	16	--	--	--	--	--	0.3	--	--	--	0.2	--	--	--	--	--	--	--	--	--	--
25-May-11	106	18.5	--	--	--	--	--	0.3	--	--	--	0.1	--	--	--	--	--	--	--	--	--	--
1-Jun-11	107	16.6	--	--	--	--	--	0.3	--	--	--	0.1	--	--	--	--	--	--	--	--	--	--
8-Jun-11	108	15.8	0.00017	0.000002	0.00131	0.00032	0.006	0.17	0.00008	0.5	0.000005	0.08	0.0163	0.00002	0.000002	0.000005	0.00018	0.0005	0.00004	0.0002	0.0033	0.0001
15-Jun-11	109	17	--	--	--	--	--	0.3	--	--	--	0.1	--	--	--	--	--	--	--	--	--	--
22-Jun-11	110	14.4	--	--	--	--	--	0.3	--	--	--	0.1	--	--	--	--	--	--	--	--	--	--
29-Jun-11	111	17.2	--	--	--	--	--	0.3	--	--	--	0.1	--	--	--	--	--	--	--	--	--	--
6-Jul-11	112	15.7	0.00021	0.000002	0.00107	0.00022	0.002	0.16	0.00011	0.7	0.000005	0.08	0.0149	0.00002	0.000002	0.000005	0.0002	0.0005	0.000021	0.0002	0.0009	0.0001
13-Jul-11	113	13.3	--	--	--	--	--	0.3	--	--	--	0.1	--	--	--	--	--	--	--	--	--	--
20-Jul-11	114	13.3	--	--	--	--	--	0.3	--	--	--	0.1	--	--	--	--	--	--	--	--	--	--
27-Jul-11	115	15.2	--	--	--	--	--	0.3	--	--	--	0.1	--	--	--	--	--	--	--	--	--	--
3-Aug-11	116	14.4	0.00017	0.000002	0.00095	0.00023	0.002	0.16	0.00029	0.6	0.000011	0.07	0.0128	0.00002	0.000003	0.000005	0.00031	0.0005	0.00001	0.0002	0.0007	0.0001
10-Aug-11	117	14.4	--	--	--	--	--	0.3	--	--	--	0.2	--	--	--	--	--	--	--	--	--	--
17-Aug-11	118	13.1	--	--	--	--	--	0.3	--	--	--	0.1	--	--	--	--	--	--	--	--	--	--
24-Aug-11	119	16.3	--	--	--	--	--	0.3	--	--	--	0.2	--	--	--	--	--	--	--	--	--	--
31-Aug-11	120	13.2	0.00025	0.000002	0.00082	0.00023	0.007	0.14	0.00008	0.5	0.000005	0.06	0.0125	0.00002	0.000002	0.000005	0.00016	0.0005	0.000003	0.0002	0.0006	0.0001
7-Sep-11	121	15	--	--	--	--	--	0.3	--	--	--	0.1	--	--	--	--	--	--	--	--	--	--
14-Sep-11	122	17.7	--	--	--	--	--	0.3	--	--	--	0.1	--	--	--	--	--	--	--	--	--	--
21-Sep-11	123	18.1	--	--	--	--	--	0.5	--	--	--	0.1	--	--	--	--	--	--	--	--	--	--
28-Sep-11	124	16.1	0.00396	0.000008	0.00092	0.00027	0.003	0.15	0.0001	0.6	0.000005	0.09	0.0149	0.00002	0.000002	0.000005	0.0003	0.0005	0.000005	0.0002	0.0093	0.0001
5-Oct-11	125	15	--	--	--	--	--	0.3	--	--	--	0.1	--	--	--	--	--	--	--	--	--	--
12-Oct-11	126	15.7	--	--	--	--	--	0.3	--	--	--	0.1	--	--	--	--	--	--	--	--	--	--
19-Oct-11	127	17.6	--	--	--	--	--	0.3	--	--	--	0.1	--	--	--	--	--	--	--	--	--	--
26-Oct-11	128	15.4	0.0003	0.000002	0.00076	0.00025	0.007	0.16	0.00011	0.6	0.000005	0.08	0.0141	0.00002	0.000002	0.000005	0.00035	0.0005	0.000012	0.0002	0.0004	0.0001
2-Nov-11	129	16.3	--	--	--	--	--	0.6	--	--	--	0.7	--	--	--	--	--	--	--	--	--	--
9-Nov-11	130	16.4	--	--	--	--	--	0.3	--	--	--	0.1	--	--	--	--	--	--	--	--	--	--
16-Nov-11	131	16.6	--	--	--	--	--	0.3	--	--	--	0.2	--	--	--	--	--	--	--	--	--	--
23-Nov-11	132	13.7	0.00123	0.000002	0.00072	0.0002	0.002	0.16	0.0001	0.5	0.000005	0.1	0.0124	0.00002	0.000002	0.000005	0.00029	0.0005	0.000002	0.0002	0.0007	0.0001
30-Nov-11	133	16.5	--	--	--	--	--	0.5	--	--	--	0.2	--	--	--	--	--	--	--	--	--	--
7-Dec-11	134	14.5	--	--	--	--	--	0.3	--	--	--	0.1	--	--	--	--	--	--	--	--	--	--
14-Dec-11	135	16.5	--	--	--	--	--	0.4	--	--	--	0.2	--	--	--	--	--	--	--	--	--	--
21-Dec-11	136	11.4	0.00033	0.000002	0.00067	0.00032	0.002	0.21	0.00007	0.4	0.000005	0.07	0.0109	0.00002	0.000004	0.000005	0.0013	0.0005	0.000002	0.0002	0.001	0.0001
28-Dec-11	137	13.7	--	--	--	--	--	0.3	--	--	--	0.1	--	--	--	--	--	--	--	--	--	--
4-Jan-12	138	14.3	--	--	--	--	--	0.4	--	--	--	0.1	--	--	--	--	--	--	--	--	--	--
11-Jan-12	139	15.4	--	--	--	--	--	0.3	--	--	--	0.1	--	--	--	--	--	--	--	--	--	--
18-Jan-12	140	15	0.00038	0.000002	0.00073	0.00024	0.004	0.23	0.00015	0.6	0.000005	0.08	0.0193	0.00002	0.000003	0.000005	0.0005	0.0005	0.000002	0.0002	0.0013	0.0001
25-Jan-12	141	15	--	--	--	--	--	0.5	--	--	--	0.1	--	--	--	--	--	--	--	--	--	--
1-Feb-12	142	15.9	--	--	--	--	--	0.5	--	--	--	0.5	--	--	--	--	--	--	--	--	--	--
8-Feb-12	143	15.5	--	--	--	--	--	0.3	--	--	--	0.4	--	--	--	--	--	--	--	--	--	--
15-Feb-12	144	14.4	0.00052	0.000002	0.00075	0.00023	0.008	0.2	0.00007	0.5	0.000005	0.08	0.0129	0.00002	0.000003	0.000005	0.0003	0.0005	0.000002	0.0002	0.0007	0.0001
22-Feb-12	145	15.4	--	--	--	--	--	0.3	--	--	--	0.3	--	--	--	--	--	--	--	--	--	--
Terminated																						

Appendix G: Kinetic Data, Humidity Cell Tests

HC-13 Boston Flotation Tailings

Loading Calculations																														
Date	Accum. Weeks	SO4	Acidity to pH 4.5	Acidity to pH 8.3	Total Alkalinity (mg CaCO3/l)	Fluoride mg/kg/wk	Chloride mg/kg/wk	Nitrate-N mg/kg/wk	Nitrite-N mg/kg/wk	Total Ammonia mg/kg/wk	Diss.-P mg/kg/wk	TDS mg/kg/wk	Hardness CaCO3 mg/kg/wk	Al mg/kg/wk	Sb mg/kg/wk	As mg/kg/wk	Ba mg/kg/wk	Be mg/kg/wk	Bi mg/kg/wk	B mg/kg/wk	Cd mg/kg/wk	Ca mg/kg/wk	Cr mg/kg/wk	Co mg/kg/wk	Cu mg/kg/wk	Fe mg/kg/wk	Pb mg/kg/wk	Li mg/kg/wk	Mg mg/kg/wk	
		mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk																									
13-May-09	0	117.75	--	0.375	28.125	0.17625	5.1	0.01875	0.01425	0.06	0.0075	204.375	133.875	0.004125	0.0015	0.016875	0.005625	0.000075	0.000075	0.0375	0.000015	26.55	0.000075	0.0007875	0.001425	0.00375	0.000075	0.00195	16.3875	
20-May-09	1	152.22	--	0.86	61.92	0.1204	1.5781	0.0215	0.00387	0.0301	0.0086	261.87	202.1	0.00172	0.001419	0.0129	0.00516	0.000086	0.000086	0.0344	0.0000172	34.83	0.000086	0.002279	0.001333	0.0043	0.000086	0.002193	27.907	
27-May-09	2	83.6	--	--	83.6	0.1276	0.3608	0.022	0.00132	0.0088	0.0088	232.32	180.4	0.00088	0.001012	0.00792	0.004	0.000088	0.000088	0.0308	0.0000176	32.78	0.000088	0.002596	0.000352	0.0044	0.000088	0.002156	28.82	
3-Jun-09	3	64.24	--	0.88	80.08	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	25.168	--	--	--	0.0044	--	--	21.648	
10-Jun-09	4	43.225	--	--	70.3	0.08075	0.18525	0.02375	0.00095	0.019	0.0095	132.05	114	0.0019	0.0007125	0.0057	0.0021375	0.000095	0.000095	0.019	0.000019	19.095	0.000095	0.0011875	0.001045	0.00475	0.000095	0.00152	16.1025	
17-Jun-09	5	25.37	--	0.43	58.91	--	--	--	--	--	--	--	--	--	--	--	15.695	--	--	--	--	--	--	--	--	0.0043	--	--	13.889	
24-Jun-09	6	16.66	--	--	66.64	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.0049	--	--	12.985
1-Jul-09	7	5.7	--	--	60.325	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00475	--	--	10.1175
8-Jul-09	8	4.73	--	--	52.03	0.0473	0.086	0.0215	0.00086	0.0731	0.0516	62.35	53.75	0.00172	0.000559	0.00473	0.001118	0.000086	0.000086	0.0172	0.0000172	8.987	0.000086	0.000344	0.000086	0.0043	0.000086	0.00086	7.654	
15-Jul-09	9	2.61	--	0.435	48.72	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	9.0045	--	--	--	0.00435	--	--	8.178	
22-Jul-09	10	3	--	--	58.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	10.15	--	--	--	0.005	--	--	9.7	
29-Jul-09	11	2.3	--	--	55.2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	9.706	--	--	--	0.0046	--	--	9.108	
5-Aug-09	12	2.3	--	--	53.82	0.023	0.092	0.023	0.00092	0.1196	0.0092	56.12	52.44	0.00184	0.000506	0.00506	0.00115	0.000092	0.000092	0.0138	0.0000184	8.234	0.000138	0.000276	0.000322	0.0046	0.000092	0.000736	7.774	
12-Aug-09	13	2.425	--	--	54.32	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	8.8755	--	--	--	0.00485	--	--	8.4875	
19-Aug-09	14	1.74	--	--	46.545	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	8.178	--	--	--	0.00435	--	--	7.8735	
26-Aug-09	15	1.29	--	--	45.58	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.525	--	--	--	0.0043	--	--	7.31	
2-Sep-09	16	0.88	--	--	46.64	0.044	0.176	0.044	0.00088	0.1804	0.0088	21.56	43.912	0.00176	0.000352	0.003696	0.001012	0.000088	0.000088	0.0088	0.0000176	6.864	0.000088	0.000176	0.00044	0.0044	0.000088	0.000484	6.468	
9-Sep-09	17	1.335	--	--	47.615	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.8765	--	--	--	0.00445	--	--	7.921	
16-Sep-09	18	0.455	--	--	48.23	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	8.008	--	--	--	0.00455	--	--	7.7805	
23-Sep-09	19	0.42	--	--	44.52	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.308	--	--	--	0.0042	--	--	7.434	
30-Sep-09	20	1.305	--	--	45.675	0.02175	0.087	0.02175	0.00087	0.19575	0.0087	46.545	48.72	0.00261	0.000348	0.0042195	0.0010875	0.0000435	0.0000435	0.01131	0.00000435	7.308	0.0002175	0.000174	0.0003915	0.00435	2.18E-05	0.000696	7.3515	
7-Oct-09	21	1.335	--	--	47.615	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.5205	--	--	--	0.00445	--	--	7.654	
14-Oct-09	22	1.335	--	--	47.17	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.6985	--	--	--	0.00445	--	--	7.7875	
21-Oct-09	23	0.95	--	--	53.2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	8.4075	--	--	--	0.00475	--	--	8.265	
28-Oct-09	24	0.88	--	--	47.52	0.022	0.088	0.022	0.00088	0.176	0.0088	47.52	54.12	0.00264	0.000308	0.003212	0.000836	0.000044	0.000044	0.01232	0.0000044	7.392	0.000088	0.000132	0.001364	0.0044	0.000022	0.000924	8.712	
4-Nov-09	25	0.84	--	--	43.26	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.308	--	--	--	0.0042	--	--	7.14	
11-Nov-09	26	0.485	--	--	48.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	8.1965	--	--	--	0.00485	--	--	8.0995	
18-Nov-09	27	0.425	--	--	42.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.14	--	--	--	0.00425	--	--	7.225	
25-Nov-09	28	0.42	--	--	43.26	0.021	0.084	0.021	0.00084	0.1386	0.0084	47.04	42	0.0021	0.000252	0.003108	0.000798	0.000042	0.000042	0.0063	0.0000042	7.854	0.000084	0.000126	0.00021	0.0042	0.000021	0.000294	5.46	
2-Dec-09	29	1.29	--	0.43	45.15	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.568	--	--	--	0.0043	--	--	7.783	
9-Dec-09	30	0.85	--	--	44.2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.0975	--	--	--	0.00425	--	--	7.225	
16-Dec-09	31	0.455	--	--	47.32	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.826	--	--	--	0.00455	--	--	7.735	
23-Dec-09	32	0.96	--	--	51.36	0.024	0.096	0.024	0.00096	0.1728	0.0096	60.96	49.615584	0.00192	0.00024	0.002976	0.001104	0.000048	0.000048	0.00672	0.0000048	8.16	0.000096	0.000096	0.000576	0.0048	0.000024	0.000528	7.104	
30-Dec-09	33	0.415	--	--	43.575	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.2625	--	--	--	0.00415	--	--	7.2625	
6-Jan-10	34	0.44	--	--	44.88	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.392	--	--	--	0.0044	--	--	7.216	
13-Jan-10	35	0.435	--	--	45.24	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.482	--	--	--	0.00435	--	--	7.4385	
20-Jan-10	36	0.43	--	0.43	44.72	0.0215	0.086	0.0215	0.00086	0.1118	0.0086	36.12	44.688008	0.00129	0.000172	0.002408	0.000602	0.000043	0.000043	0.00473	0.0000043	7.052	0.000086	0.000086	0.000172	0.0043	2.15E-05	0.000387	6.579	
27-Jan-10	37	1.245	--	--	41.915	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.055	--	--	--	0.00415	--	--	6.972	
3-Feb-10	38	0.41	--	--	43.05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.462	--	--	--	0.0041	--	--	7.134	
10-Feb-10	39	0.92	--	--	48.3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	8.234	--	--	--	0.0046	--	--	8.096	
17-Feb-10	40	0.89	--	--	46.725	0.02225	0.089	0.02225	0.00089	0.0979	0.0089	41.385	49.177484	0.001335	0.000178	0.0018245	0.0006675	0.0000445	0.0000445	0.00445	0.00000445	7.298	0.000089	0.0000445	0.000178	0.00445	2.23E-05	0.000267	7.5205	
24-Feb-10	41	0.88	--	--	44.88	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.744	--	--	--	0.0044	--	--	7.392	
3-Mar-10	42	1.305	--	0.435	43.935	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.134	--	--	--	0.00435	--	--	6.873	
10-Mar-10	43	1.335	--	--	44.945	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.743	--	--	--	0.00445	--	--	7.5205	
17-Mar-10	44	0.88	--	--	44.44	0.022	0.088	0.022	0.00088	0.1012	--	--	45.656028	0.00132	0.000176	0.001892	0.00066	0.000044	0.000044	0.00396	0.0000044	7.26	0.000088	0.000044	0.000088	0.0044	0.000022	0.000352	6.888	
24-Mar-10	45	0.84	--	0.42	39.48	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6.93	--	--	--	0.0042	--	--	6.552	
31-Mar-10	46	0.47	--	--	47	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	8.272	--	--	--	0.0047	--	--	8.037	
7-Apr-10	47	0.44	--	0.88	45.76	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.348	--	--	--	0.0044	--	--	7.084	
14-Apr-10	48	0.93	--	0.465	46.5	0.00465	0.2325	0.0093	0.002325	0.0651	0.002325	39.06	50.0134935	0.00186	0.0002325	0.001395	0.000465	0.0000465	0.000465	0.02325	0.00000465	7.7655	0.000465	0.0002325	0.0002325	0.002325	0.000093	0.002325	7.44	
21-Apr-10	49	0.91	--	--	45.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.462	--	--	--	0.00455	--	--	7.1435	
28-Apr-10	50	0.88	--	--	43.56	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.128	--	--	--	0.0044	--	--	7.04	
5-May-10	51	0.9	--	0.45	47.25	--	--																							

Appendix G: Kinetic Data, Humidity Cell Tests

Boston Flotation HC-13 Tailings		Loading Calculations																												
Date	Accum. Weeks	SO4 mg/kg/wk	Acidity to pH 4.5 mg/kg/wk	Acidity to pH 8.3 mg/kg/wk	Total Alkalinity (mg CaCO3/l) mg/kg/wk	Fluoride mg/kg/wk	Chloride mg/kg/wk	Nitrate-N mg/kg/wk	Nitrite-N mg/kg/wk	Total Ammonia mg/kg/wk	Diss.-P mg/kg/wk	TDS mg/kg/wk	Hardness CaCO3 mg/kg/wk	Al mg/kg/wk	Sb mg/kg/wk	As mg/kg/wk	Ba mg/kg/wk	Be mg/kg/wk	Bi mg/kg/wk	B mg/kg/wk	Cd mg/kg/wk	Ca mg/kg/wk	Cr mg/kg/wk	Co mg/kg/wk	Cu mg/kg/wk	Fe mg/kg/wk	Pb mg/kg/wk	Li mg/kg/wk	Mg mg/kg/wk	
1-Dec-10	81	0.86	--	--	39.56	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6.106	--	--	--	0.0043	--	--	--	6.149
8-Dec-10	82	0.94	--	--	44.65	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.144	--	--	--	0.0047	--	--	--	7.332
15-Dec-10	83	0.88	--	--	40.92	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6.38	--	--	--	0.0044	--	--	--	6.468
22-Dec-10	84	0.87	--	--	40.89	--	0.348	--	--	--	--	--	41.7165	0.0011745	0.00007395	0.0005307	0.0003828	0.00000435	0.000002175	0.02175	0.000002175	6.4815	0.0003915	0.00001479	0.00009135	0.00087	7.4E-06	0.000218	6.2205	
29-Dec-10	85	1.365	--	--	44.135	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.0525	--	--	--	0.00455	--	--	--	7.28
5-Jan-11	86	1.305	--	--	42.195	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6.96	--	--	--	0.00435	--	--	--	7.0905
12-Jan-11	87	0.91	--	--	42.315	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.1435	--	--	--	0.00455	--	--	--	7.1435
19-Jan-11	88	1.26	--	--	38.22	0.0168	0.21	0.0084	0.0021	0.021	0.0021	41.16	39.27	0.000924	0.0000714	0.0004242	0.0003528	0.0000042	0.0000021	0.021	0.0000021	6.09	0.00042	0.00000756	0.0001176	0.00042	5.46E-06	0.00021	5.838	
26-Jan-11	89	1.32	--	--	41.36	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.04	--	--	--	0.0044	--	--	--	7.216
2-Feb-11	90	1.26	--	--	39.9	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6.51	--	--	--	0.0042	--	--	--	6.804
9-Feb-11	91	1.32	--	--	42.68	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6.996	--	--	--	0.0044	--	--	--	7.216
16-Feb-11	92	0.9	--	--	40.05	--	0.225	--	--	--	--	--	40.635	0.00144	0.0000765	0.000549	0.000369	0.0000045	0.00000225	0.0225	0.00000225	5.715	0.000405	0.00002295	0.0001305	0.00135	6.75E-06	0.000225	6.39	
23-Feb-11	93	0.94	--	--	43.71	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.144	--	--	--	0.0047	--	--	--	7.191
2-Mar-11	94	0.88	--	--	40.92	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.04	--	--	--	0.0044	--	--	--	7.084
9-Mar-11	95	1.275	--	0.425	38.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6.375	--	--	--	0.00425	--	--	--	6.5875
16-Mar-11	96	0.88	--	--	40.48	0.0044	0.264	0.022	0.0022	0.02288	0.00924	44	41.14	0.00176	0.0000704	0.0003784	0.0003872	0.0000044	0.0000022	0.022	0.0000022	6.336	0.000308	0.0000066	0.0000396	0.00044	2.2E-06	0.00022	6.16	
23-Mar-11	97	0.86	--	--	38.27	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5.891	--	--	--	0.0043	--	--	--	5.891
30-Mar-11	98	0.84	--	--	36.96	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5.67	--	--	--	0.0042	--	--	--	6.048
6-Apr-11	99	0.2375	--	--	43.7	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.2675	--	--	--	0.00475	--	--	--	7.505
13-Apr-11	100	0.704	--	--	40.48	--	0.22	--	--	--	--	--	40.128	0.001364	0.000066	0.000396	0.0003256	0.0000044	0.0000022	0.022	0.0000022	6.336	0.000264	0.00000836	0.0000352	0.00044	2.2E-06	0.00022	5.896	
20-Apr-11	101	0.7905	--	--	43.245	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6.975	--	--	--	0.00465	--	--	--	7.161
27-Apr-11	102	0.51	--	--	39.525	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6.5025	--	--	--	0.00425	--	--	--	6.545
4-May-11	103	1.408	--	0.44	44	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6.6	--	--	--	0.0044	--	--	--	6.864
11-May-11	104	0.6675	--	0.445	44.055	0.00445	0.2225	0.0178	0.002225	0.04895	0.00267	39.16	44.5	0.0009345	0.00006675	0.000356	0.00036045	0.00000445	0.000002225	0.02225	0.00000267	6.5415	0.000267	0.000004005	0.0000623	0.000445	2.23E-06	0.000223	6.8975	
18-May-11	105	0.602	--	--	42.57	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6.536	--	--	--	0.0043	--	--	--	6.88
25-May-11	106	0.9215	--	--	51.895	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	8.342	--	--	--	0.00485	--	--	--	8.9725
1-Jun-11	107	1.452	--	--	42.68	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6.864	--	--	--	0.0044	--	--	--	7.304
8-Jun-11	108	0.42	--	--	40.74	--	0.21	--	--	--	--	--	42.42	0.001554	0.0000672	0.0003612	0.0003822	0.0000042	0.0000021	0.021	0.00000336	6.09	0.00021	0.00000546	0.000042	0.00084	5.88E-06	0.00021	6.636	
15-Jun-11	109	2.8365	--	--	47.43	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.3005	--	--	--	0.00465	--	--	--	7.905
22-Jun-11	110	0.8925	--	--	37.825	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6.0775	--	--	--	0.00425	--	--	--	6.12
29-Jun-11	111	0.21	--	--	39.06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6.846	--	--	--	0.0042	--	--	--	7.224
6-Jul-11	112	0.768	--	--	48	0.0048	0.24	0.024	0.0024	0.03984	0.0024	52.8	51.36	0.002448	0.000072	0.000312	0.0003744	0.0000048	0.0000024	0.024	0.0000024	8.112	0.00024	0.00000576	0.0000768	0.00144	1.25E-05	0.00024	7.536	
13-Jul-11	113	0.516	--	--	35.26	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5.762	--	--	--	0.0043	--	--	--	5.719
20-Jul-11	114	0.6375	--	--	35.275	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5.6525	--	--	--	0.00425	--	--	--	5.6525
27-Jul-11	115	0.572	--	--	39.6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6.732	--	--	--	0.0044	--	--	--	6.688
3-Aug-11	116	0.6375	--	--	37.4	--																								

Appendix G: Kinetic Data, Humidity Cell Tests

Boston
Flotation
HC-13 Tailings

Loading Calculations																					
Date	Accum. Weeks	Mn mg/kg/wk	Hg (CVAF) mg/kg/wk	Mo mg/kg/wk	Ni mg/kg/wk	P mg/kg/wk	K mg/kg/wk	Se mg/kg/wk	Si mg/kg/wk	Ag mg/kg/wk	Na mg/kg/wk	Sr mg/kg/wk	Te mg/kg/wk	Tl mg/kg/wk	Th mg/kg/wk	Sn mg/kg/wk	Ti mg/kg/wk	U mg/kg/wk	V mg/kg/wk	Zn mg/kg/wk	Zr mg/kg/wk
13-May-09	0	0.018375	0.0000075	0.124875	0.007125	0.01125	1.51875	0.002813	0.35625	8.63E-05	6.4125	0.0885	0.000075	7.5E-06	3.75E-05	0.000338	0.000075	3.75E-05	0.000075	0.00075	0.00075
20-May-09	1	0.03483	0.0000086	0.07783	0.01634	0.0129	1.5265	0.003999	0.516	2.15E-05	3.2035	0.10105	0.000086	8.6E-06	0.000043	0.000129	0.000086	0.000043	0.000086	0.00043	0.00086
27-May-09	2	0.03256	0.0000088	0.03828	0.01628	0.0132	1.1484	0.00374	0.4796	0.000022	1.144	0.08976	0.000088	8.8E-06	0.000044	0.000088	0.000044	0.000088	0.00044	0.00088	0.00088
3-Jun-09	3	--	--	--	--	--	0.748	--	--	--	0.572	--	--	--	--	--	--	--	--	--	--
10-Jun-09	4	0.018525	0.0000095	0.024225	0.0057	0.01425	0.7695	0.002233	0.38	2.38E-05	0.39425	0.054625	0.000095	9.5E-06	4.75E-05	0.000143	0.000095	4.75E-05	0.000095	0.000475	0.00095
17-Jun-09	5	--	--	--	--	--	0.602	--	--	--	0.301	--	--	--	--	--	--	--	--	--	--
24-Jun-09	6	--	--	--	--	--	0.49	--	--	--	0.245	--	--	--	--	--	--	--	--	--	--
1-Jul-09	7	--	--	--	--	--	0.4275	--	--	--	0.2375	--	--	--	--	--	--	--	--	--	--
8-Jul-09	8	0.00903	0.0000086	0.01204	0.001548	0.0129	0.4945	0.00043	0.2752	2.15E-05	0.1548	0.02322	0.000086	8.6E-06	0.000043	0.000086	0.000086	0.000043	0.000086	0.00043	0.00086
15-Jul-09	9	--	--	--	--	--	0.435	--	--	--	0.174	--	--	--	--	--	--	--	--	--	--
22-Jul-09	10	--	--	--	--	--	0.5	--	--	--	0.2	--	--	--	--	--	--	--	--	--	--
29-Jul-09	11	--	--	--	--	--	0.46	--	--	--	0.138	--	--	--	--	--	--	--	--	--	--
5-Aug-09	12	0.00828	0.0000092	0.0069	0.00115	0.0322	0.414	0.00046	0.2576	0.000023	0.1564	0.02024	0.000092	9.2E-06	0.000046	0.000092	0.000046	0.000092	0.00046	0.00092	0.00092
12-Aug-09	13	--	--	--	--	--	0.388	--	--	--	0.0485	--	--	--	--	--	--	--	--	--	--
19-Aug-09	14	--	--	--	--	--	0.348	--	--	--	0.1305	--	--	--	--	--	--	--	--	--	--
26-Aug-09	15	--	--	--	--	--	0.43	--	--	--	0.129	--	--	--	--	--	--	--	--	--	--
2-Sep-09	16	0.00616	0.0000088	0.00352	0.000704	0.0132	0.3828	0.00044	0.2508	0.000022	0.1144	0.01848	0.000088	8.8E-06	0.000044	0.000088	0.000044	0.000088	0.00088	0.00088	0.00088
9-Sep-09	17	--	--	--	--	--	0.356	--	--	--	0.1335	--	--	--	--	--	--	--	--	--	--
16-Sep-09	18	--	--	--	--	--	0.364	--	--	--	0.091	--	--	--	--	--	--	--	--	--	--
23-Sep-09	19	--	--	--	--	--	0.294	--	--	--	0.084	--	--	--	--	--	--	--	--	--	--
30-Sep-09	20	0.00522	0.0000087	0.003089	0.000609	0.0174	0.3393	0.000305	0.24795	1.74E-05	0.10875	0.01653	0.000087	8.7E-06	2.18E-05	4.35E-05	0.000087	2.18E-05	4.35E-05	0.000435	4.35E-05
7-Oct-09	21	--	--	--	--	--	0.356	--	--	--	0.089	--	--	--	--	--	--	--	--	--	--
14-Oct-09	22	--	--	--	--	--	0.3115	--	--	--	0.089	--	--	--	--	--	--	--	--	--	--
21-Oct-09	23	--	--	--	--	--	0.3325	--	--	--	0.095	--	--	--	--	--	--	--	--	--	--
28-Oct-09	24	0.00418	0.0000088	0.00242	0.000484	0.0066	0.286	0.000088	0.2772	1.76E-05	0.1056	0.01628	0.000088	8.8E-06	0.000022	0.000044	0.000088	0.000022	0.000044	0.00044	0.000044
4-Nov-09	25	--	--	--	--	--	0.252	--	--	--	0.084	--	--	--	--	--	--	--	--	--	--
11-Nov-09	26	--	--	--	--	--	0.291	--	--	--	0.097	--	--	--	--	--	--	--	--	--	--
18-Nov-09	27	--	--	--	--	--	0.2125	--	--	--	0.085	--	--	--	--	--	--	--	--	--	--
25-Nov-09	28	0.002478	0.0000084	0.001932	0.000462	0.0063	0.2814	0.000252	0.1974	1.68E-05	0.0714	0.01386	0.000084	8.4E-06	0.000021	0.000042	0.000084	0.000021	0.000042	0.00042	0.000042
2-Dec-09	29	--	--	--	--	--	0.215	--	--	--	0.086	--	--	--	--	--	--	--	--	--	--
9-Dec-09	30	--	--	--	--	--	0.2125	--	--	--	0.085	--	--	--	--	--	--	--	--	--	--
16-Dec-09	31	--	--	--	--	--	0.273	--	--	--	0.091	--	--	--	--	--	--	--	--	--	--
23-Dec-09	32	0.002496	0.0000096	0.001584	0.000576	0.0192	0.264	0.000192	0.2448	1.92E-05	0.096	0.01488	0.000096	9.6E-06	0.000024	0.000048	0.000096	0.000024	0.000048	0.00144	0.000048
30-Dec-09	33	--	--	--	--	--	0.2075	--	--	--	0.083	--	--	--	--	--	--	--	--	--	--
6-Jan-10	34	--	--	--	--	--	0.176	--	--	--	0.088	--	--	--	--	--	--	--	--	--	--
13-Jan-10	35	--	--	--	--	--	0.174	--	--	--	0.087	--	--	--	--	--	--	--	--	--	--
20-Jan-10	36	0.001763	0.0000086	0.001333	0.000344	0.00645	0.1892	0.000172	0.2107	1.72E-05	0.0688	0.01247	0.000086	8.6E-06	2.15E-05	0.000043	0.000086	2.15E-05	0.000043	0.00043	0.000043
27-Jan-10	37	--	--	--	--	--	0.166	--	--	--	0.083	--	--	--	--	--	--	--	--	--	--
3-Feb-10	38	--	--	--	--	--	0.164	--	--	--	0.082	--	--	--	--	--	--	--	--	--	--
10-Feb-10	39	--	--	--	--	--	0.184	--	--	--	0.046	--	--	--	--	--	--	--	--	--	--
17-Feb-10	40	0.001157	0.0000089	0.001202	0.000356	0.006675	0.2047	0.000178	0.24475	1.78E-05	0.08455	0.012861	0.000089	8.9E-06	2.23E-05	4.45E-05	0.000089	2.23E-05	4.45E-05	0.00089	4.45E-05
24-Feb-10	41	--	--	--	--	--	0.11	--	--	--	0.044	--	--	--	--	--	--	--	--	--	--
3-Mar-10	42	--	--	--	--	--	0.174	--	--	--	0.087	--	--	--	--	--	--	--	--	--	--
10-Mar-10	43	--	--	--	--	--	0.1335	--	--	--	0.089	--	--	--	--	--	--	--	--	--	--
17-Mar-10	44	0.00088	0.0000088	0.0011	0.00022	0.0066	0.1848	0.00022	0.242	1.76E-05	0.0748	0.01188	0.000088	8.8E-06	0.000022	0.000044	0.000088	0.000022	0.000044	0.00044	0.000044
24-Mar-10	45	--	--	--	--	--	0.126	--	--	--	0.084	--	--	--	--	--	--	--	--	--	--
31-Mar-10	46	--	--	--	--	--	0.188	--	--	--	0.047	--	--	--	--	--	--	--	--	--	--
7-Apr-10	47	--	--	--	--	--	0.132	--	--	--	0.088	--	--	--	--	--	--	--	--	--	--
14-Apr-10	48	0.000465	0.0000093	0.001395	0.000465	0.00465	0.18135	0.00014	0.27156	9.3E-06	0.0837	0.01209	0.000465	4.19E-06	0.000465	5.58E-05	0.002325	4.65E-05	0.000093	0.002325	0.000233
21-Apr-10	49	--	--	--	--	--	0.1365	--	--	--	0.091	--	--	--	--	--	--	--	--	--	--
28-Apr-10	50	--	--	--	--	--	0.176	--	--	--	0.088	--	--	--	--	--	--	--	--	--	--
5-May-10	51	--	--	--	--	--	0.18	--	--	--	0.18	--	--	--	--	--	--	--	--	--	--
12-May-10	52	0.000462	0.0000084	0.001054	0.00034	0.00084	0.1512	0.000126	0.252	2.1E-06	0.0672	0.011172	8.4E-06	2.94E-06	2.1E-06	0.000063	0.00021	1.68E-06	0.000084	0.000042	0.000042
19-May-10	53	--	--	--	--	--	0.1425	--	--	--	0.095	--	--	--	--	--	--	--	--	--	--
26-May-10	54	--	--	--	--	--	0.1455	--	--	--	0.0485	--	--	--	--	--	--	--	--	--	--
2-Jun-10	55	--	--	--	--	--	0.1305	--	--	--	0.087	--	--	--	--	--	--	--	--	--	--
9-Jun-10	56	0.0001376	0.0000086	0.00089	0.000275	0.00086	0.1376	0.000116	0.215	2.15E-06	0.0645	0.009933	8.6E-06	3.01E-06	2.15E-06	6.45E-05	0.000215	1.72E-06	0.000086	0.000258	0.000043
16-Jun-10	57	--	--	--	--	--	0.1305	--	--	--	0.0435	--	--	--	--	--	--	--	--	--	--
23-Jun-10	58	--	--	--	--	--	0.135	--	--	--	0.045	--	--	--	--	--	--	--	--	--	--
30-Jun-10	59	--	--	--	--	--	0.135	--	--	--	0.045	--	--	--	--	--	--	--	--	--	--
7-Jul-10	60	0.00020825	0.0000085	0.00102	0.000238	0.00085	0.136	9.35E-05	0.2125	2.13E-06	0.0595	0.009265	8.5E-06	2.13E-06	2.13E-06	5.53E-05	0.000213	3.83E-06	0.000085	0.000128	4.25E-05
14-Jul-10	61	--	--	--	--	--	0.135	--	--	--	0.09	--	--	--	--	--	--	--	--	--	--
21-Jul-10	62	--	--	--	--	--	0.132	--	--	--	0.044	--	--	--	--	--	--	--	--	--	--
28-Jul-10	63	--	--	--	--	--	0.144	--	--	--	0.048	--	--	--	--	--	--	--	--	--	--
4-Aug-10	64	0.0000924	0.0000088	0.000906	0.000238	0.00088	0.1276	0.000128	0.22	2.2E-06	0.0572	0.009944	8.8E-06	2.64E-06	2.2E-06	5.72E-05	0.00022	1.32E-06	0.000088	0.000044	0.000044
11-Aug-10	65	--	--	--	--	--	0.132	--	--	--	0.088	--	--	--	--	--	--	--	--	--	--
18-Aug-10	66	--	--	--	--	--	0.1395	--	--	--	0.0465	--	--	--	--	--	--	--	--	--	--
25-Aug-10	67	--	--	--	--	--	0.1425	--	--	--	0.0475	--	--	--	--	--	--	--	--	--	--
1-Sep-10	68	0.00008925	0.0000085	0.000761	0.000208	0.00085	0.102	8.08E-05	0.2125	2.13E-06	0.04675	0.00918	8.5E-06	2.13E-06	2.13E-06	5.53E-05	0.000213	1.7			

Appendix G: Kinetic Data, Humidity Cell Tests

Boston
Flotation
HC-13 Tailings

Loading Calculations																					
Date	Accum. Weeks	Mn mg/kg/wk	Hg (CVAF) mg/kg/wk	Mo mg/kg/wk	Ni mg/kg/wk	P mg/kg/wk	K mg/kg/wk	Se mg/kg/wk	Si mg/kg/wk	Ag mg/kg/wk	Na mg/kg/wk	Sr mg/kg/wk	Te mg/kg/wk	Tl mg/kg/wk	Th mg/kg/wk	Sn mg/kg/wk	Ti mg/kg/wk	U mg/kg/wk	V mg/kg/wk	Zn mg/kg/wk	Zr mg/kg/wk
1-Dec-10	81	--	--	--	--	--	0.129	--	--	--	0.043	--	--	--	--	--	--	--	--	--	--
8-Dec-10	82	--	--	--	--	--	0.141	--	--	--	0.141	--	--	--	--	--	--	--	--	--	--
15-Dec-10	83	--	--	--	--	--	0.132	--	--	--	0.044	--	--	--	--	--	--	--	--	--	--
22-Dec-10	84	0.00007395	8.7E-07	0.000518	0.00017	0.00087	0.10875	5.66E-05	0.2175	2.18E-06	0.05655	0.007439	8.7E-06	8.7E-07	2.18E-06	5.66E-05	0.000218	1.09E-05	0.000087	0.000174	4.35E-05
29-Dec-10	85	--	--	--	--	--	0.1365	--	--	--	0.0455	--	--	--	--	--	--	--	--	--	--
5-Jan-11	86	--	--	--	--	--	0.1305	--	--	--	0.0435	--	--	--	--	--	--	--	--	--	--
12-Jan-11	87	--	--	--	--	--	0.1365	--	--	--	0.0455	--	--	--	--	--	--	--	--	--	--
19-Jan-11	88	0.0000588	8.4E-07	0.000542	0.00013	0.00084	0.0756	0.000042	0.21	2.1E-06	0.0336	0.007056	8.4E-06	8.4E-07	2.1E-06	6.72E-05	0.00021	3.36E-06	0.000084	0.000042	0.000042
26-Jan-11	89	--	--	--	--	--	0.132	--	--	--	0.044	--	--	--	--	--	--	--	--	--	--
2-Feb-11	90	--	--	--	--	--	0.21	--	--	--	0.126	--	--	--	--	--	--	--	--	--	--
9-Feb-11	91	--	--	--	--	--	0.132	--	--	--	0.044	--	--	--	--	--	--	--	--	--	--
16-Feb-11	92	0.0001575	0.0000009	0.000599	0.000212	0.0009	0.0765	0.000099	0.225	2.25E-06	0.0405	0.00711	0.000009	9E-07	2.25E-06	0.000108	0.000225	8.55E-06	0.00009	0.00009	0.000045
23-Feb-11	93	--	--	--	--	--	0.141	--	--	--	0.047	--	--	--	--	--	--	--	--	--	--
2-Mar-11	94	--	--	--	--	--	0.132	--	--	--	0.044	--	--	--	--	--	--	--	--	--	--
9-Mar-11	95	--	--	--	--	--	0.1275	--	--	--	0.0425	--	--	--	--	--	--	--	--	--	--
16-Mar-11	96	0.000044	8.8E-07	0.000488	0.000114	0.00132	0.0704	5.72E-05	0.22	2.64E-06	0.0352	0.006644	8.8E-06	1.32E-06	2.2E-06	0.000088	0.00022	2.64E-06	0.000088	0.000088	0.000044
23-Mar-11	97	--	--	--	--	--	0.129	--	--	--	0.043	--	--	--	--	--	--	--	--	--	--
30-Mar-11	98	--	--	--	--	--	0.126	--	--	--	0.042	--	--	--	--	--	--	--	--	--	--
6-Apr-11	99	--	--	--	--	--	0.1425	--	--	--	0.095	--	--	--	--	--	--	--	--	--	--
13-Apr-11	100	0.0000748	8.8E-07	0.000554	0.000128	0.00484	0.066	0.000044	0.22	2.2E-06	0.0352	0.007128	8.8E-06	8.8E-07	2.2E-06	8.36E-05	0.00022	7.48E-06	0.000088	0.000044	0.000044
20-Apr-11	101	--	--	--	--	--	0.186	--	--	--	0.0465	--	--	--	--	--	--	--	--	--	--
27-Apr-11	102	--	--	--	--	--	0.1275	--	--	--	0.0425	--	--	--	--	--	--	--	--	--	--
4-May-11	103	--	--	--	--	--	0.132	--	--	--	0.176	--	--	--	--	--	--	--	--	--	--
11-May-11	104	0.0000534	8.9E-07	0.000445	0.000134	0.004005	0.0712	4.01E-05	0.267	2.23E-06	0.0356	0.006408	8.9E-06	1.78E-06	2.23E-06	0.000147	0.000223	2.67E-06	0.000089	0.000178	4.45E-05
18-May-11	105	--	--	--	--	--	0.129	--	--	--	0.086	--	--	--	--	--	--	--	--	--	--
25-May-11	106	--	--	--	--	--	0.1455	--	--	--	0.0485	--	--	--	--	--	--	--	--	--	--
1-Jun-11	107	--	--	--	--	--	0.132	--	--	--	0.044	--	--	--	--	--	--	--	--	--	--
8-Jun-11	108	0.0000714	8.4E-07	0.00055	0.000134	0.00252	0.0714	3.36E-05	0.21	2.1E-06	0.0336	0.006846	8.4E-06	8.4E-07	2.1E-06	7.56E-05	0.00021	1.68E-05	0.000084	0.001386	0.000042
15-Jun-11	109	--	--	--	--	--	0.1395	--	--	--	0.0465	--	--	--	--	--	--	--	--	--	--
22-Jun-11	110	--	--	--	--	--	0.1275	--	--	--	0.0425	--	--	--	--	--	--	--	--	--	--
29-Jun-11	111	--	--	--	--	--	0.126	--	--	--	0.042	--	--	--	--	--	--	--	--	--	--
6-Jul-11	112	0.0001008	9.6E-07	0.000514	0.000106	0.00096	0.0768	5.28E-05	0.336	2.4E-06	0.0384	0.007152	9.6E-06	9.6E-07	2.4E-06	0.000096	0.00024	1.01E-05	0.000096	0.000432	0.000048
13-Jul-11	113	--	--	--	--	--	0.129	--	--	--	0.043	--	--	--	--	--	--	--	--	--	--
20-Jul-11	114	--	--	--	--	--	0.1275	--	--	--	0.0425	--	--	--	--	--	--	--	--	--	--
27-Jul-11	115	--	--	--	--	--	0.132	--	--	--	0.044	--	--	--	--	--	--	--	--	--	--
3-Aug-11	116	0.00007225	8.5E-07	0.000404	9.78E-05	0.00085	0.068	0.000123	0.255	4.68E-06	0.02975	0.00544	8.5E-06	1.28E-06	2.13E-06	0.000132	0.000213	4.25E-06	0.000085	0.000298	4.25E-05
10-Aug-11	117	--	--	--	--	--	0.135	--	--	--	0.09	--	--	--	--	--	--	--	--	--	--
17-Aug-11	118	--	--	--	--	--	0.132	--	--	--	0.044	--	--	--	--	--	--	--	--	--	--
24-Aug-11	119	--	--	--	--	--	0.1335	--	--	--	0.089	--	--	--	--	--	--	--	--	--	--
31-Aug-11	120	0.00012125	9.7E-07	0.000398	0.000112	0.003395	0.0679	3.88E-05	0.2425	2.43E-06	0.0291	0.006063	9.7E-06	9.7E-07	2.43E-06	7.76E-05	0.000243	1.46E-06	0.000097	0.000291	4.85E-05
7-Sep-11	121	--	--	--	--	--	0.1305	--	--	--	0.0435	--	--	--	--	--	--	--	--	--	--
14-Sep-11	122	--	--	--	--	--	0.1335	--	--	--	0.0445	--	--	--	--	--	--	--	--	--	--
21-Sep-11	123	--	--	--	--	--	0.225	--	--	--	0.045	--	--	--	--	--	--	--	--	--	--
28-Sep-11	124	0.0017226	3.48E-06	0.0004	0.000117	0.001305	0.06525	4.35E-05	0.261	2.18E-06	0.03915	0.006482	8.7E-06	8.7E-07	2.18E-06	0.000131	0.000218	2.18E-06	0.000087	0.004046	4.35E-05
5-Oct-11	125	--	--	--	--	--	0.1305	--	--	--	0.0435	--	--	--	--	--	--	--	--	--	--
12-Oct-11	126	--	--	--	--	--	0.1275	--	--	--	0.0425	--	--	--	--	--	--	--	--	--	--
19-Oct-11	127	--	--	--	--	--	0.1305	--	--	--	0.0435	--	--	--	--	--	--	--	--	--	--
26-Oct-11	128	0.0001335	8.9E-07	0.000338	0.000111	0.003115	0.0712	4.9E-05	0.267	2.23E-06	0.0356	0.006275	8.9E-06	8.9E-07	2.23E-06	0.000156	0.000223	5.34E-06	0.000089	0.000178	4.45E-05
2-Nov-11	129	--	--	--	--	--	0.252	--	--	--	0.294	--	--	--	--	--	--	--	--	--	--
9-Nov-11	130	--	--	--	--	--	0.132	--	--	--	0.044	--	--	--	--	--	--	--	--	--	--
16-Nov-11	131	--	--	--	--	--	0.132	--	--	--	0.088	--	--	--	--	--	--	--	--	--	--
23-Nov-11	132	0.00058425	9.5E-07	0.000342	0.000095	0.00095	0.076	4.75E-05	0.2375	2.38E-06	0.0475	0.00589	9.5E-06	9.5E-07	2.38E-06	0.000138	0.000238	9.5E-07	0.000095	0.000333	4.75E-05
30-Nov-11	133	--	--	--	--	--	0.2125	--	--	--	0.085	--	--	--	--	--	--	--	--	--	--
7-Dec-11	134	--	--	--	--	--	0.1335	--	--	--	0.0445	--	--	--	--	--	--	--	--	--	--
14-Dec-11	135	--	--	--	--	--	0.178	--	--	--	0.089	--	--	--	--	--	--	--	--	--	--
21-Dec-11	136	0.0001452	8.8E-07	0.000295	0.000141	0.00088	0.0924	3.08E-05	0.176	2.2E-06	0.0308	0.004796	8.8E-06	1.76E-06	2.2E-06	0.000572	0.00022	8.8E-07	0.000088	0.00044	0.000044
28-Dec-11	137	--	--	--	--	--	0.1305	--	--	--	0.0435	--	--	--	--	--	--	--	--	--	--
4-Jan-12	138	--	--	--	--	--	0.174	--	--	--	0.0435	--	--	--	--	--	--	--	--	--	--
11-Jan-12	139	--	--	--	--	--	0.1395	--	--	--	0.0465	--	--	--	--	--	--	--	--	--	--
18-Jan-12	140	0.0001596	8.4E-07	0.000307	0.000101	0.00168	0.0966	0.000063	0.252	2.1E-06	0.0336	0.008106	8.4E-06	1.26E-06	2.1E-06	0.00021	0.00021	8.4E-07	0.000084	0.000546	0.000042
25-Jan-12	141	--	--	--	--	--	0.2225	--	--	--	0.0445	--	--	--	--	--	--	--	--	--	--
1-Feb-12	142	--	--	--	--	--	0.2225	--	--	--	0.2225	--	--	--	--	--	--	--	--	--	--
8-Feb-12	143	--	--	--	--	--	0.129	--	--	--	0.172	--	--	--	--	--	--	--	--	--	--
15-Feb-12	144	0.0002262	8.7E-07	0.000326	0.0001	0.00348	0.087	3.05E-05	0.2175	2.18E-06	0.0348	0.005612	8.7E-06	1.31E-06	2.18E-06	0.000131	0.000218	8.7E-07	0.000087	0.000305	4.35E-05
22-Feb-12	145	--	--	--	--	--	0.144	--	--	--	0.144	--	--	--	--	--	--	--	--	--	--
Terminated																					

Appendix G: Kinetic Data, Humidity Cell Tests

**HC-2 Boston CND
Residue
Tailings**

Concentrations																																
Date	Accum. Weeks	Volume (ml)		pH (pH Units)	EC (µS/cm)	ORP (mV)	SO4 (mg/l)	Acidity to pH 4.5 mg CaCO3/L	Acidity to pH 8.3	Alkalinity to pH 4.5	Fluoride (mg/l)	Chloride (mg/l)	Nitrate-N (mg/l)	Nitrite-N (mg/l)	Total Ammonia (mgN/l)	Diss.-P (mgP/l)	TDS (mg/l)	Total CN (mg/l)	WAD CN (mg/l)	Free CN (mg/l)	SCN (mg/l)	CNO (mg/l)	Hardness CaCO3 (mg/l)	Al mg/l	Sb mg/l	As mg/l	Ba mg/l	Be mg/l	Bi mg/l	B mg/l	Cd mg/l	
		Input	Output																				Calculation									
22-Oct-08	0	950	560	0.01	1	50	1	1	1	0.1	0.2	0.02	0.002	0.01	0.001	10	0.02	0.02	0.02	50.06	0.1	Calculation	0.005	0.001	0.001	0.001	0.001	0.001	0.001	0.05	0.0002	
29-Oct-08	1	500	480	7.69	797	240	363	--	2.5	60	0.05	4.78	0.05	0.002	4.38	0.12	1190	0.06	0.02	0.02	0.02	0.1	551	0.043	0.1	0.32	0.029	0.001	0.001	0.05	0.0002	
5-Nov-08	2	500	450	7.61	747	235	339	--	2.5	32.5	0.1	1.18	0.05	0.002	1.89	0.02	280	0.02	0.02	0.02	0.1	282	0.033	0.037	0.051	0.01	0.001	0.001	0.05	0.0002		
12-Nov-08	3	500	440	7.66	788	220	354	--	2	33	--	--	--	--	--	--	--	0.02	0.02	0.02	--	--	--	0.09	--	--	--	--	--	--		
19-Nov-08	4	500	495	7.57	655	220	319	--	2.5	30	0.05	0.49	0.01	0.002	1.38	0.02	575	0.02	0.02	0.02	4.4	0.1	364	--	0.011	0.03	0.007	0.001	0.001	0.05	0.0002	
26-Nov-08	5	500	435	7.67	590	145	266	--	1	27	--	--	--	--	--	--	--	0.02	0.02	0.02	--	--	--	--	--	--	--	--	--	--	--	
3-Dec-08	6	500	430	7.59	525	150	236	--	1.5	28	--	--	--	--	--	--	--	0.02	0.02	0.02	--	--	--	--	--	--	--	--	--	--	--	
10-Dec-08	7	500	470	7.58	626	145	380	--	1.5	25	--	--	--	--	--	--	--	--	--	--	--	--	--	0.06	--	--	--	--	--	--	--	--
17-Dec-08	8	500	430	7.67	800	120	395	--	1.67	30	0.05	1	0.5	0.002	0.8	0.02	535	0.02	0.02	0.02	3.43	0.1	342	0.008	0.003	0.01	0.005	0.001	0.001	0.05	0.0002	
24-Dec-08	9	500	450	7.6	953	160	319	--	2	24	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
31-Dec-08	10	500	450	7.54	513	170	259	--	2	22	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7-Jan-09	11	500	495	7.67	929	160	565	--	1.5	29	--	--	--	--	--	--	--	--	--	--	--	--	--	0.06	--	--	--	--	--	--	--	--
14-Jan-09	12	500	490	7.49	715	170	379	--	1	21.6	0.05	0.2	0.01	0.002	0.45	0.03	530	0.02	0.02	0.02	2.98	0.1	386	0.028	0.003	0.01	0.004	0.001	0.001	0.05	0.0002	
21-Jan-09	13	500	490	7.44	742	175	405	--	1.5	22	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
28-Jan-09	14	500	460	7.64	1187	150	595	--	3	40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Feb-09	15	500	465	7.69	1186	160	417	--	1.5	33.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11-Feb-09	16	500	470	7.43	801	170	329	--	1.66	23.3	0.1	0.4	0.1	0.002	0.34	0.02	454	0.02	0.02	0.02	3.17	0.1	432	0.002	0.0022	0.01	0.0029	0.0002	0.0002	0.02	0.00004	
18-Feb-09	17	500	445	7.4	600	180	284	--	1	19	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
25-Feb-09	18	500	445	7.53	500	150	266	--	2	19	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Mar-09	19	500	455	7.45	587	160	240	--	4	42	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11-Mar-09	20	500	445	7.55	505	175	238	--	1	27	0.1	0.4	0.01	0.002	0.29	0.02	384	0.02	0.03	0.02	1.48	0.1	254	0.001	0.0015	0.0033	0.0022	0.0002	0.0002	0.02	0.00004	
18-Mar-09	21	500	460	7.49	678	175	369	--	2	39	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
25-Mar-09	22	500	460	7.5	594	180	299	--	1	19	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1-Apr-09	23	500	475	7.68	691	160	398	--	1	17	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8-Apr-09	24	500	455	7.66	689	170	327	--	2	35	0.05	0.2	0.01	0.002	0.33	0.02	423	0.02	0.02	0.02	--	--	432	0.002	0.0017	0.0057	0.0033	0.0002	0.0002	0.02	0.00004	
15-Apr-09	25	500	475	7.56	710	165	392	--	2	31	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
22-Apr-09	26	500	440	7.23	593	165	315	--	4	38	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
29-Apr-09	27	500	435	7.24	496	165	254	--	4	39	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6-May-09	28	500	440	7.69	538	170	296	--	2	33	0.1	0.4	0.1	0.002	0.36	0.02	413	0.02	0.02	0.02	0.75	0.1	354	0.003	0.0013	0.0027	0.002	0.0002	0.0002	0.01	0.00004	
13-May-09	29	500	450	7.43	590	175	303	--	3	33	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
20-May-09	30	500	455	7.48	630	180	373	--	4	32	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
27-May-09	31	500	485	7.42	685	160	327	--	2	35	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3-Jun-09	32	500	450	7.57	431	155	210	--	1	25	0.05	0.2	0.05	0.003	0.28	0.02	326	0.02	0.02	0.02	0.1	0.1	206	0.001	0.001	0.0015	0.0012	0.0002	0.0002	0.01	0.00004	
10-Jun-09	33	500	460	7.56	703	135	368	--	3	46	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
17-Jun-09	34	500	435	7.46	529	150	255	--	3	28	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
24-Jun-09	35	500	455	7.39	645	140	363	--	4	35	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1-Jul-09	36	500	440	7.65	629	140	302	--	3	35	0.05	0.2	0.05	0.002	0.33	0.02	527	0.02	0.02	0.02	0.38	0.1	294	0.001	0.0012	0.0021	0.0016	0.0002	0.0002	0.02	0.00004	
8-Jul-09	37	500	425	7.34	542	140	284	--	4	29	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
15-Jul-09	38	500	425	7.1	494	160	228	--	5	32	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
22-Jul-09	39	500	470	7.48	950	140	310	--	5	47	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
29-Jul-09	40	500	460	7.75	564	145	331	--	1	27	0.05	0.2	0.05	0.002	0.29	0.02	440	0.02	0.02	0.02	0.1	0.1	336	0.001	0.001	0.0019	0.0012	0.0002	0.0002	0.01	0.00004	
5-Aug-09	41	500	430	7.35	496	155	276	--	2	23	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12-Aug-09	42	500	460	7.35	488	150	258	--	1	34	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
19-Aug-09	43	500	430	7.53	950	160	531	--	2	54	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
26-Aug-09	44	500	430	7.78	688	175	436	--	2	36	0.25	1	0.25	0.002	0.25	0.02	581	0.02	0.02	0.02	0.1	0.1	424	0.001	0.0011	0.0014	0.0053	0.0002	0.0002	0.01	0.00004	
2-Sep-09	45	500	430	7.61	664	150	336	--	1	34	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9-Sep-09	46	500	455	7.53	763	160	435	--	2	34	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
16-Sep-09	47	500	440	7.38	723	140	483	--	3	37	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
23-Sep-09	48	500	425	7.5	827	155	477	--	2	33	0.25	1	0.25	0.0025	0.14	0.02	637	0.02	0.02	0.02	0.1	0.1	494	0.002	0.001	0.0014	0.0017	0.0001	0.0001	0.015	0.00005	
30-Sep-09	49	500	435	7.12	909	160	462	--	2	40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7-Oct-09	50	500	425	7.08	1547	145	729	--	2	55	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
14-Oct-09	51	500	420	7.11	1128	135	667	--	3	44	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
21-Oct-09	52	500	445	7.38	810	145	422	--	2	28	0.05	0.2	0.05	0.002	0.08	0.02	636	0.02	0.02	0.02	0.1	0.1	520	0.002	0.001	0.0027	0.0012	0.0001	0.0001	0.013	0.00002</	

Appendix G: Kinetic Data, Humidity Cell Tests

**HC-2 Boston CND
Residue
Tailings**

[illegible]

Appendix G: Kinetic Data, Humidity Cell Tests

Boston CND
Residue
HC-2 Tailings

Concentrations																															
Date	Accum. Weeks	Volume (ml)		pH	EC	ORP	SO4	Acidity to pH	Acidity to pH	Alkalinity	Fluoride	Chloride	Nitrate-N	Nitrite-N	Total Ammonia	Diss.-P	TDS	Total CN	WAD CN	Free CN	SCN	CNO	Hardness CaCO3	Al	Sb	As	Ba	Be	Bi	B	Cd
		4.5	8.3					to pH 4.5	mg CaCO3/L																						
		Input	Output	(pH Units)	(µs/cm)	(mV)	(mg/l)	mg CaCO3/L	mg CaCO3/L																						
8-Feb-12	172	5	5	0.01	1	50	1	1	1	0.1	0.2	0.02	0.002	0.01	0.001	10	0.02	0.02	0.02			Calculation	0.005	0.001	0.001	0.001	0.001	0.001	0.05	0.0002	
15-Feb-12	173	500	430	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
22-Feb-12	174	500	420	7.61	902	125	386	--	1	26	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
29-Feb-12	175	500	410	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7-Mar-12	176	500	435	7.77	1185	130	496	--	1	33	0.019	0.9	0.053	0.005	0.27	0.0094	710	--	--	--	--	--	508	0.0021	0.0017	0.0026	0.00236	0.00001	0.000005	0.05	0.000027
14-Mar-12	177	500	435	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
21-Mar-12	178	500	435	7.63	956	130	449	--	1	30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
28-Mar-12	179	500	430	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Apr-12	180	500	445	7.74	969	130	443	--	1	32	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11-Apr-12	181	500	440	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
18-Apr-12	182	500	445	7.72	868	125	415	--	1	37	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
25-Apr-12	183	500	430	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-May-12	184	500	420	7.74	1015	125	539	--	1	34	0.018	0.5	0.02	0.005	0.23	0.005	752	--	--	--	--	--	521	0.00187	0.00168	0.00396	0.00257	0.00001	0.000005	0.05	0.000023
9-May-12	185	500	430	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
16-May-12	186	500	440	7.7	1040	120	424	--	1	29	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
23-May-12	187	500	450	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
30-May-12	188	500	445	7.67	1025	125	433	--	2	35	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6-Jun-12	189	500	430	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
13-Jun-12	190	500	445	7.64	866	130	374	--	2	28	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
20-Jun-12	191	500	430	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
27-Jun-12	192	500	430	7.62	862	140	360	--	1	29	0.011	0.5	0.02	0.005	0.23	0.0066	618	--	--	--	--	--	443	0.00203	0.00132	0.00273	0.00159	0.00001	0.000005	0.05	0.0000213
4-Jul-12	193	500	445	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11-Jul-12	194	500	420	7.79	875	135	362	--	1	27	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
18-Jul-12	195	500	440	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
25-Jul-12	196	500	440	7.78	891	135	371	--	0.81	30.8	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1-Aug-12	197	500	430	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8-Aug-12	198	500	450	7.73	832	130	350	--	1.11	28.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
15-Aug-12	199	500	460	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
22-Aug-12	200	500	430	7.73	848	130	361	--	1.34	27.7	0.011	0.63	0.02	0.005	0.33	0.005	658	--	--	--	--	--	432	0.00798	0.00125	0.00361	0.00149	0.00001	0.000005	0.05	0.000016
29-Aug-12	201	500	425	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5-Sep-12	202	500	435	7.62	870	145	358	--	2.09	30.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12-Sep-12	203	500	450	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
19-Sep-12	204	500	420	7.65	814	140	390	--	2.5	29.8	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
26-Sep-12	205	500	425	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3-Oct-12	206	500	420	7.74	742	140	331	--	0.83	24.2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10-Oct-12	207	500	420	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
17-Oct-12	208	500	455	7.55	838	145	400	--	4.57	26.6	0.01	0.59	0.02	0.005	0.12	0.0088	618	--	--	--	--	--	450	0.00303	0.00103	0.0025	0.00131	0.00001	0.000005	0.05	0.000011
24-Oct-12	209	500	425	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
31-Oct-12	210	500	430	7.38	886	135	413	--	2	30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Terminated																															

Appendix G: Kinetic Data, Humidity Cell Tests

Boston CND
Residue
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Concentrations																													
Date	Accum. Weeks	Ca	Cr	Co	Cu	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	Te	Tl	Th	Sn	Ti	U	V	Zn	Zr
		mg/l 0.05	mg/l 0.001	mg/l 0.001	mg/l 0.001	mg/l 0.05	mg/l 0.001	mg/l 0.001	mg/l 0.05	mg/l 0.001	mg/l 0.000002	mg/l 0.0005	mg/l 0.001	mg/l 0.15	mg/l 0.1	mg/l 0.001	mg/l 0.25	mg/l 0.00025	mg/l 0.05	mg/l 0.001	mg/l 0.001	mg/l 0.0001	mg/l 0.0005	mg/l 0.001	mg/l 0.001	mg/l 0.0005	mg/l 0.001	mg/l 0.005	mg/l 0.01
22-Oct-08	0	136	0.001	0.087	0.008	0.05	0.001	0.005	51.6	0.2	0.00002	0.045	0.51	0.15	12.9	0.017	1.3	0.00025	117	0.35	0.001	0.0001	0.0005	0.001	0.001	0.0005	0.001	0.005	0.01
29-Oct-08	1	74.2	0.001	0.056	0.004	0.05	0.001	0.002	23.4	0.18	0.00002	0.014	0.29	0.15	5.5	0.008	0.6	0.00025	33.5	0.15	0.001	0.0001	0.0005	0.001	0.001	0.0005	0.001	0.005	0.01
5-Nov-08	2	100	0.001	0.069	0.005	0.05	0.001	0.001	36.7	0.22	0.00002	0.0093	0.38	0.15	5.3	0.01	0.4	--	26.2	0.15	0.001	0.0001	0.0005	0.001	0.001	0.0005	0.001	0.005	0.01
12-Nov-08	3	115	--	--	--	0.01	--	--	44.7	--	--	--	--	--	5.3	--	--	--	21.4	--	--	--	--	--	--	--	--	--	--
19-Nov-08	4	84.9	0.001	0.075	--	0.01	0.001	0.002	38.1	0.25	0.00002	0.0046	0.42	0.15	3.1	0.013	0.3	0.00025	13.1	0.13	0.001	0.0001	0.0005	0.001	0.001	0.0005	0.001	0.005	0.01
26-Nov-08	5	60.4	--	--	--	0.02	--	--	27.9	--	--	--	--	--	2.1	--	--	--	7.3	--	--	--	--	--	--	--	--	--	--
3-Dec-08	6	64	--	--	--	0.03	--	--	34.9	--	--	--	--	--	2.3	--	--	--	7.3	--	--	--	--	--	--	--	--	--	--
10-Dec-08	7	75.8	--	--	--	0.01	--	--	53.3	--	--	--	--	--	2.9	--	--	--	9.2	--	--	--	--	--	--	--	--	--	--
17-Dec-08	8	60.6	0.001	0.064	0.026	0.05	0.001	0.003	46.2	0.3	0.00002	0.0019	0.28	0.15	2.2	0.02	0.25	0.00025	6.78	0.081	0.001	0.0001	0.0005	0.001	0.001	0.0005	0.001	0.006	0.01
24-Dec-08	9	50.6	--	--	--	0.01	--	--	41	--	--	--	--	--	1.2	--	--	--	4.5	--	--	--	--	--	--	--	--	--	--
31-Dec-08	10	44.2	--	--	--	0.01	--	--	39.9	--	--	--	--	--	1.4	--	--	--	3.8	--	--	--	--	--	--	--	--	--	--
7-Jan-09	11	73	--	--	--	0.01	--	--	83.2	--	--	--	--	--	2.2	--	--	--	6.9	--	--	--	--	--	--	--	--	--	--
14-Jan-09	12	52.8	0.001	0.05	0.002	0.05	0.001	0.003	61.7	0.26	0.00002	0.0006	0.19	0.15	1.7	0.02	0.25	0.00025	4.28	0.07	0.001	0.0001	0.0005	0.001	0.001	0.0005	0.001	0.005	0.01
21-Jan-09	13	55.7	--	--	--	0.01	--	--	69	--	--	--	--	--	1.2	--	--	--	4.4	--	--	--	--	--	--	--	--	--	--
28-Jan-09	14	98.8	--	--	--	0.01	--	--	109	--	--	--	--	--	2.3	--	--	--	5.6	--	--	--	--	--	--	--	--	--	--
4-Feb-09	15	66.3	--	--	--	0.01	--	--	76.3	--	--	--	--	--	1.4	--	--	--	3.4	--	--	--	--	--	--	--	--	--	--
11-Feb-09	16	54.2	0.0002	0.048	0.0015	0.01	0.0002	0.002	72	0.249	0.00002	0.0003	0.163	0.03	1.46	0.019	0.19	0.00005	2.56	0.071	0.0002	0.00002	0.0001	0.0002	0.0002	0.0001	0.0002	0.003	0.002
18-Feb-09	17	18.9	--	--	--	0.01	--	--	20.8	--	--	--	--	--	0.3	--	--	--	0.7	--	--	--	--	--	--	--	--	--	--
25-Feb-09	18	34.9	--	--	--	0.01	--	--	43.1	--	--	--	--	--	0.25	--	--	--	1.3	--	--	--	--	--	--	--	--	--	--
4-Mar-09	19	44.9	--	--	--	0.01	--	--	57.5	--	--	--	--	--	0.9	--	--	--	1.6	--	--	--	--	--	--	--	--	--	--
11-Mar-09	20	32.6	0.0002	0.036	0.0015	0.01	0.0002	0.0014	41.8	0.26	0.00002	0.0001	0.14	0.03	0.92	0.011	0.15	0.00005	1.17	0.042	0.0002	0.00002	0.0001	0.0002	0.0002	0.0001	0.0002	0.002	0.002
18-Mar-09	21	43.3	--	--	--	0.01	--	--	71	--	--	--	--	--	0.9	--	--	--	1.1	--	--	--	--	--	--	--	--	--	--
25-Mar-09	22	33.7	--	--	--	0.01	--	--	61.4	--	--	--	--	--	0.7	--	--	--	1.4	--	--	--	--	--	--	--	--	--	--
1-Apr-09	23	41.9	--	--	--	0.01	--	--	87.6	--	--	--	--	--	1	--	--	--	1.9	--	--	--	--	--	--	--	--	--	--
8-Apr-09	24	44.4	0.0002	0.051	0.0007	0.03	0.0002	0.0022	78	0.369	0.00002	0.0001	0.173	0.03	1.07	0.016	0.33	0.00005	1.42	0.057	0.0002	0.00002	0.0001	0.0002	0.0002	0.0001	0.0002	0.004	0.002
15-Apr-09	25	46.2	--	--	--	0.01	--	--	89.7	--	--	--	--	--	1	--	--	--	1.7	--	--	--	--	--	--	--	--	--	--
22-Apr-09	26	39.6	--	--	--	0.02	--	--	60.2	--	--	--	--	--	0.8	--	--	--	1	--	--	--	--	--	--	--	--	--	--
29-Apr-09	27	33	--	--	--	0.01	--	--	49.1	--	--	--	--	--	0.5	--	--	--	0.7	--	--	--	--	--	--	--	--	--	--
6-May-09	28	34.1	0.0002	0.035	0.0028	0.05	0.0002	0.0016	65.3	0.256	0.00002	0.0001	0.135	0.03	0.77	0.0099	0.16	0.00005	0.87	0.037	0.0002	0.00002	0.0001	0.0002	0.0002	0.0001	0.0002	0.004	0.002
13-May-09	29	35.8	--	--	--	0.01	--	--	64.7	--	--	--	--	--	0.5	--	--	--	0.9	--	--	--	--	--	--	--	--	--	--
20-May-09	30	38.3	--	--	--	0.01	--	--	71.9	--	--	--	--	--	0.6	--	--	--	0.9	--	--	--	--	--	--	--	--	--	--
27-May-09	31	41.6	--	--	--	0.01	--	--	78.2	--	--	--	--	--	0.7	--	--	--	1	--	--	--	--	--	--	--	--	--	--
3-Jun-09	32	22.2	0.0002	0.019	0.0005	0.01	0.0002	0.0007	36.5	0.113	0.00002	0.0001	0.072	0.03	0.47	0.0057	0.11	0.00005	0.43	0.029	0.0002	0.00002	0.0001	0.0002	0.0002	0.0001	0.0002	0.003	0.002
10-Jun-09	33	46.1	--	--	--	0.01	--	--	82	--	--	--	--	--	0.6	--	--	--	0.8	--	--	--	--	--	--	--	--	--	--
17-Jun-09	34	33.4	--	--	--	0.01	--	--	62.9	--	--	--	--	--	0.6	--	--	--	0.6	--	--	--	--	--	--	--	--	--	--
24-Jun-09	35	40.5	--	--	--	0.01	--	--	80.6	--	--	--	--	--	0.5</														

Appendix G: Kinetic Data, Humidity Cell Tests

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		Concentrations																												
Date	Accum. Weeks	Ca mg/l	Cr mg/l	Co mg/l	Cu mg/l	Fe mg/l	Pb mg/l	Li mg/l	Mg mg/l	Mn mg/l	Hg mg/l	Mo mg/l	Ni mg/l	P mg/l	K mg/l	Se mg/l	Si mg/l	Ag mg/l	Na mg/l	Sr mg/l	Te mg/l	Tl mg/l	Th mg/l	Sn mg/l	Ti mg/l	U mg/l	V mg/l	Zn mg/l	Zr mg/l	
		0.05	0.001	0.001	0.001	0.05	0.001	0.001	0.05	0.001	0.000002	0.0005	0.001	0.15	0.1	0.001	0.25	0.00025	0.05	0.001	0.0001	0.0005	0.001	0.001	0.0005	0.001	0.0005	0.001	0.005	0.01
16-Jun-10	86	119	--	--	--	0.01	--	--	66.5	--	--	--	--	--	0.3	--	--	--	0.2	--	--	--	--	--	--	--	--	--	--	--
23-Jun-10	87	117	--	--	--	0.01	--	--	64.7	--	--	--	--	--	0.4	--	--	--	0.2	--	--	--	--	--	--	--	--	--	--	--
30-Jun-10	88	119	0.0003	0.0123	0.00102	0.004	0.000036	0.002	57.3	0.0482	0.00002	0.00067	0.0567	0.002	0.42	0.00398	0.2	0.000005	0.21	0.105	0.00002	0.000013	0.000005	0.00007	0.0005	0.000012	0.0002	0.0019	0.0001	
7-Jul-10	89	122	--	--	--	0.01	--	--	63	--	--	--	--	--	0.3	--	--	--	0.2	--	--	--	--	--	--	--	--	--	--	--
14-Jul-10	90	133	--	--	--	0.01	--	--	70.4	--	--	--	--	--	0.3	--	--	--	0.2	--	--	--	--	--	--	--	--	--	--	--
21-Jul-10	91	122	--	--	--	0.01	--	--	65.2	--	--	--	--	--	0.3	--	--	--	0.2	--	--	--	--	--	--	--	--	--	--	--
28-Jul-10	92	113	0.0002	0.011	0.00097	0.005	0.000036	0.002	56.3	0.043	0.00002	0.0006	0.05	0.002	0.4	0.0032	0.19	0.000005	0.2	0.1	0.00002	0.000014	0.000005	0.00006	0.0005	0.000012	0.0002	--	0.0001	
4-Aug-10	93	125	--	--	--	0.01	--	--	67	--	--	--	--	--	0.4	--	--	--	0.3	--	--	--	--	--	--	--	--	--	--	--
11-Aug-10	94	120	--	--	--	0.01	--	--	58.7	--	--	--	--	--	0.3	--	--	--	0.2	--	--	--	--	--	--	--	--	--	--	--
18-Aug-10	95	123	--	--	--	0.01	--	--	58.3	--	--	--	--	--	0.3	--	--	--	0.2	--	--	--	--	--	--	--	--	--	--	--
25-Aug-10	96	114	0.0001	0.0108	0.00091	0.006	0.000038	0.0019	46.8	0.0343	0.00002	0.00057	0.0485	0.002	0.4	0.00258	0.2	0.000005	0.17	0.107	0.00002	0.000014	0.000005	0.00005	0.0005	0.000011	0.0002	0.0017	0.0001	
1-Sep-10	97	118	--	--	--	0.01	--	--	52.9	--	--	--	--	--	0.4	--	--	--	0.2	--	--	--	--	--	--	--	--	--	--	--
8-Sep-10	98	120	--	--	--	0.01	--	--	54	--	--	--	--	--	0.3	--	--	--	0.2	--	--	--	--	--	--	--	--	--	--	--
15-Sep-10	99	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
22-Sep-10	100	118	--	--	0.01	0.03	--	--	51.8	--	--	--	--	--	0.3	--	--	--	0.2	--	--	--	--	--	--	--	--	--	--	--
29-Sep-10	101	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6-Oct-10	102	111	--	--	0.01	0.03	--	--	46.2	--	--	--	--	--	0.3	--	--	--	0.2	--	--	--	--	--	--	--	--	--	--	--
13-Oct-10	103	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
20-Oct-10	104	113	0.0001	0.00956	0.00038	0.007	0.000041	0.0017	44.1	0.0307	0.000026	0.00042	0.0456	0.006	0.38	0.0025	0.2	0.000005	0.18	0.0889	0.00002	0.000012	0.000005	0.00004	0.0005	0.000015	0.0002	0.0023	0.0001	
27-Oct-10	105	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3-Nov-10	106	117	--	--	--	0.01	--	--	46	--	--	--	--	--	0.3	--	--	--	0.2	--	--	--	--	--	--	--	--	--	--	--
10-Nov-10	107	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
17-Nov-10	108	114	--	--	--	0.01	--	--	44.3	--	--	--	--	--	0.3	--	--	--	0.2	--	--	--	--	--	--	--	--	--	--	--
24-Nov-10	109	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1-Dec-10	110	106	--	--	--	0.01	--	--	40	--	--	--	--	--	0.3	--	--	--	0.2	--	--	--	--	--	--	--	--	--	--	--
8-Dec-10	111	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
15-Dec-10	112	112	0.0007	0.00768	0.00042	0.007	0.000025	0.0014	39.5	0.0288	0.000002	0.00051	0.0395	0.007	0.36	0.00197	0.2	0.000005	0.17	0.0772	0.00002	0.000014	0.000005	0.00006	0.0017	0.000014	0.0006	0.0016	0.0001	
22-Dec-10	113	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
29-Dec-10	114	107	--	--	--	0.01	--	--	39	--	--	--	--	--	0.3	--	--	--	0.1	--	--	--	--	--	--	--	--	--	--	--
5-Jan-11	115	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12-Jan-11	116	111	--	--	--	0.01	--	--	40.8	--	--	--	--	--	0.4	--	--	--	0.1	--	--	--	--	--	--	--	--	--	--	--
19-Jan-11	117	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
26-Jan-11	118	113	--	--	--	0.01	--	--	41	--	--	--	--	--	0.7	--	--	--	0.3	--	--	--	--	--	--	--	--	--	--	--
2-Feb-11	119	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9-Feb-11	120	125	0.0001	0.00705	0.0004	0.002	0.00001	0.0014	40.3	0.0265	0.000004	0.00049	0.0381	0.007	0.34	0.00213	0.3	0.000008	0.17	0.0744	0.00002	0.000013	0.000005	0.00007	0.0005	0.000012	0.0002	0.002	0.0001	
16-Feb-11	121	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
23-Feb-11	122	111	--	--	--	0.01	--	--	40.7	--	--	--	--	--	0.4	--	--	--	0.4	--	--	--	--	--	--	--	--	--	--	--
2-Mar-11	123	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Appendix G: Kinetic Data, Humidity Cell Tests

Boston CND
Residue
HC-2 Tailings

Concentrations																														
Date	Accum. Weeks	Ca mg/l	Cr mg/l	Co mg/l	Cu mg/l	Fe mg/l	Pb mg/l	Li mg/l	Mg mg/l	Mn mg/l	Hg mg/l	Mo mg/l	Ni mg/l	P mg/l	K mg/l	Se mg/l	Si mg/l	Ag mg/l	Na mg/l	Sr mg/l	Te mg/l	Tl mg/l	Th mg/l	Sn mg/l	Ti mg/l	U mg/l	V mg/l	Zn mg/l	Zr mg/l	
		0.05	0.001	0.001	0.001	0.05	0.001	0.001	0.05	0.001	0.000002	0.0005	0.001	0.15	0.1	0.001	0.25	0.00025	0.05	0.001	0.001	0.0001	0.0005	0.001	0.001	0.0005	0.001	0.005	0.01	
8-Feb-12	172	102	--	--	--	0.01	--	--	45.7	--	--	--	--	--	0.3	--	--	--	0.4	--	--	--	--	--	--	--	--	--	--	--
15-Feb-12	173	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
22-Feb-12	174	107	--	--	--	0.01	--	--	49.6	--	--	--	--	--	0.5	--	--	--	0.5	--	--	--	--	--	--	--	--	--	--	--
29-Feb-12	175	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7-Mar-12	176	126	0.0001	0.00386	0.00065	0.003	0.000074	0.0013	46.8	0.0167	0.000002	0.00036	0.0334	0.015	0.37	0.00082	0.2	0.000005	0.12	0.0775	0.00002	0.000051	0.000005	0.0002	0.0005	0.000006	0.0002	0.0041	0.0001	
14-Mar-12	177	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
21-Mar-12	178	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
28-Mar-12	179	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Apr-12	180	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11-Apr-12	181	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
18-Apr-12	182	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
25-Apr-12	183	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-May-12	184	128	0.0001	0.00357	0.00083	0.0031	0.000046	0.0005	48.9	0.0117	0.000002	0.000412	0.0296	0.0039	0.37	0.000911	0.23	0.000005	0.128	0.0841	0.00002	0.000049	0.000005	0.00079	0.0005	0.000009	0.0002	0.00149	0.0001	
9-May-12	185	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
16-May-12	186	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
23-May-12	187	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
30-May-12	188	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6-Jun-12	189	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
13-Jun-12	190	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
20-Jun-12	191	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
27-Jun-12	192	113	0.0001	0.00282	0.000373	0.0014	0.0000107	0.00114	39.1	0.0136	0.000002	0.000244	0.0273	0.0069	0.287	0.000578	0.21	0.000005	0.085	0.0658	0.00002	0.0000546	0.000005	0.0002	0.0005	0.0000063	0.0002	0.0012	0.0001	
4-Jul-12	193	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11-Jul-12	194	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
18-Jul-12	195	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
25-Jul-12	196	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1-Aug-12	197	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8-Aug-12	198	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
15-Aug-12	199	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
22-Aug-12	200	107	0.00016	0.00326	0.000856	0.0157	0.000068	0.0009	39.9	0.018	0.000002	0.000279	0.0286	0.0052	0.274	0.000497	0.2	0.000006	0.086	0.0666	0.00002	0.000051	0.000005	0.00043	0.0005	0.000009	0.00062	0.00152	0.0001	
29-Aug-12	201	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5-Sep-12	202	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12-Sep-12	203	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
19-Sep-12	204	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
26-Sep-12	205	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3-Oct-12	206	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10-Oct-12	207	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
17-Oct-12	208	107	0.00012	0.00186	0.000736	0.0039	0.000019	0.001	44.7	0.00854	0.000002	0.000307	0.0228	0.0072	0.195	0.00139	0.18	0.000005	0.085	0.0635	0.000022	0.000041	0.000005	0.00047	0.0005	0.000005	0.0002	0.00086	0.0001	
24-Oct-12	209	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
31-Oct-12	210	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Terminated																														

Appendix G: Kinetic Data, Humidity Cell Tests

Boston CND
Residue
HC-2 Tailings

Loading Calculations																										
Date	Accum. Weeks	SO4 mg/kg/wk	Acidity to pH 4.5 mg/kg/wk	Acidity to pH 8.3 mg/kg/wk	Total Alkalinity	Fluoride mg/kg/wk	Chloride mg/kg/wk	Nitrate-N mg/kg/wk	Nitrite-N mg/kg/wk	Total Ammonia	Diss.-P mg/kg/wk	TDS mg/kg/wk	Total CN mg/kg/wk	WAD CN mg/kg/wk	Free CN mg/kg/wk	SCN mg/kg/wk	CNO mg/kg/wk	Hardness CaCO3 mg/kg/wk	Al mg/kg/wk	Sb mg/kg/wk	As mg/kg/wk	Ba mg/kg/wk	Be mg/kg/wk	Bi mg/kg/wk	B mg/kg/wk	Cd mg/kg/wk
					mg/kg/wk					mg/kg/wk																
22-Oct-08	0	398.72	--	2.8	33.6	0.028	2.6768	0.028	0.00112	2.4528	0.0672	666.4	0.0336	0.0112	0.0112	28.0336	0.056	308.56	0.02408	0.056	0.1792	0.01624	0.00056	0.00056	0.028	0.000112
29-Oct-08	1	174.24	--	1.2	20.4	0.024	0.5664	0.024	0.00096	0.9072	0.0096	134.4	0.0096	0.0096	0.0096	0.048	0.048	135.36	0.01584	0.01776	0.02448	0.0048	0.00048	0.00048	0.024	0.000096
5-Nov-08	2	152.55	--	1.125	14.625	0.045	0.3465	0.0045	0.0009	0.792	0.009	220.5	0.009	0.009	0.009	2.25	0.045	180.45	0.01035	0.0108	0.03105	0.0045	0.00045	0.00045	0.0225	0.00009
12-Nov-08	3	155.76	--	0.88	14.52	--	--	--	--	--	--	--	0.0088	0.0088	0.0088	--	--	--	0.0396	--	--	--	--	--	--	--
19-Nov-08	4	157.905	--	1.2375	14.85	0.02475	0.24255	0.00495	0.00099	0.6831	0.0099	284.625	0.0099	0.0099	0.0099	2.178	0.0495	180.18	--	0.005445	0.01485	0.003465	0.000495	0.000495	0.02475	0.000099
26-Nov-08	5	115.71	--	0.435	11.745	--	--	--	--	--	--	--	0.0087	0.0087	0.0087	--	--	--	--	--	--	--	--	--	--	--
3-Dec-08	6	101.48	--	0.645	12.04	--	--	--	--	--	--	--	0.0086	0.0086	0.0086	--	--	--	--	--	--	--	--	--	--	--
10-Dec-08	7	178.6	--	0.705	11.75	--	--	--	--	--	--	--	--	--	--	--	--	--	0.0282	--	--	--	--	--	--	--
17-Dec-08	8	169.85	--	0.7181	12.9	0.0215	0.43	0.215	0.00086	0.344	0.0086	230.05	0.0086	0.0086	0.0086	1.4749	0.043	147.06	0.00344	0.00129	0.0043	0.00215	0.00043	0.00043	0.0215	0.000086
24-Dec-08	9	143.55	--	0.9	10.8	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
31-Dec-08	10	116.55	--	0.9	9.9	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7-Jan-09	11	279.675	--	0.7425	14.355	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
14-Jan-09	12	185.71	--	0.49	10.584	0.0245	0.098	0.0049	0.00098	0.2205	0.0147	259.7	0.0098	0.0098	0.0098	1.4602	0.049	189.14	0.01372	0.00147	0.0049	0.00196	0.00049	0.00049	0.0245	0.000098
21-Jan-09	13	198.45	--	0.735	10.78	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
28-Jan-09	14	273.7	--	1.38	18.4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Feb-09	15	193.905	--	0.6975	15.5775	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11-Feb-09	16	154.63	--	0.7802	10.951	0.047	0.188	0.047	0.00094	0.1598	0.0094	213.38	0.0094	0.0094	0.0094	1.4899	0.047	203.04	0.00094	0.001034	0.0047	0.001363	0.000094	0.000094	0.0094	0.0000188
18-Feb-09	17	126.38	--	0.445	8.455	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
25-Feb-09	18	118.37	--	0.89	8.455	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Mar-09	19	109.2	--	1.82	19.11	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11-Mar-09	20	105.91	--	0.445	12.015	0.0445	0.178	0.00445	0.00089	0.12905	0.0089	170.88	0.0089	0.01335	0.0089	0.6586	0.0445	113.03	0.000445	0.0006675	0.0014685	0.000979	0.000089	0.000089	0.0089	0.0000178
18-Mar-09	21	169.74	--	0.92	17.94	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
25-Mar-09	22	137.54	--	0.46	8.74	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1-Apr-09	23	189.05	--	0.475	8.075	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8-Apr-09	24	148.785	--	0.91	15.925	0.02275	0.091	0.00455	0.00091	0.15015	0.0091	192.465	0.0091	0.0091	0.0091	--	--	196.56	0.00091	0.0007735	0.0025935	0.0015015	0.000091	0.000091	0.0091	0.0000182
15-Apr-09	25	186.2	--	0.95	14.725	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
22-Apr-09	26	138.6	--	1.76	16.72	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
29-Apr-09	27	110.49	--	1.74	16.965	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6-May-09	28	130.24	--	0.88	14.52	0.044	0.176	0.044	0.00088	0.1584	0.0088	181.72	0.0088	0.0088	0.0088	0.33	0.044	155.76	0.00132	0.000572	0.001188	0.00088	0.000088	0.000088	0.0044	0.0000176
13-May-09	29	136.35	--	1.35	14.85	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
20-May-09	30	169.715	--	1.82	14.56	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
27-May-09	31	158.595	--	0.97	16.975	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3-Jun-09	32	94.5	--	0.45	11.25	0.0225	0.09	0.0225	0.00135	0.126	0.009	146.7	0.009	0.009	0.009	0.045	0.045	92.7	0.00045	0.00045	0.000675	0.00054	0.00009	0.00009	0.0045	0.000018
10-Jun-09	33	169.28	--	1.38	21.16	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
17-Jun-09	34	110.925	--	1.305	12.18	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
24-Jun-09	35	165.165	--	1.82	15.925	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1-Jul-09	36	132.88	--	1.32	15.4	0.022	0.088	0.022	0.00088	0.1452	0.0088	231.88	0.0088	0.0088	0.0088	0.1672	0.044	129.36	0.00044	0.000528	0.000924	0.000704	0.000088	0.000088	0.0088	0.0000176
8-Jul-09	37	120.7	--	1.7	12.325	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			

Appendix G: Kinetic Data, Humidity Cell Tests

Boston CND
Residue
HC-2 Tailings

Loading Calculations																											
Date	Accum. Weeks	SO4	Acidity to pH 4.5	Acidity to pH 8.3	Total Alkalinity	Fluoride	Chloride	Nitrate-N	Nitrite-N	Total Ammonia	Diss.-P	TDS	Total CN	WAD CN	Free CN	SCN	CNO	Hardness CaCO3	Al	Sb	As	Ba	Be	Bi	B	Cd	
		mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	
24-Mar-10	74	362.92	--	0.86	17.2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
31-Mar-10	75	365.4	--	1.35	14.85	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
7-Apr-10	76	366.885	--	0.465	14.88	0.02325	0.2325	0.0372	0.002325	0.002325	--	558	--	--	--	0.0465	0.0465	369.7959	0.000465	0.0006417	0.00177165	0.0013392	0.00000465	2.325E-06	0.02325	1.9995E-05	
14-Apr-10	77	308	--	0.88	14.08	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
21-Apr-10	78	342.24	--	0.93	15.345	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
28-Apr-10	79	293.25	--	0.85	12.75	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
5-May-10	80	294.84	--	0.91	13.195	0.02275	0.2275	0.0091	0.002275	0.0091	0.002275	432.25	0.0091	0.0091	0.0091	0.0455	0.0455	315.398629	0.000364	0.00065065	0.00127855	0.0011102	0.00000455	2.275E-06	0.02275	0.00001638	
12-May-10	81	287.1	--	0.9	13.05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
19-May-10	82	269.28	--	0.88	13.2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
26-May-10	83	271.35	--	0.9	13.95	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
2-Jun-10	84	284.28	--	0.92	14.72	0.0138	0.23	0.0092	0.0023	0.023	--	432.4	--	--	--	0.046	0.046	263.969988	0.000414	0.0007038	0.0018216	0.0010442	0.0000046	0.0000023	0.023	0.00001288	
9-Jun-10	85	273.615	--	0.87	13.485	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
16-Jun-10	86	250.36	--	0.88	13.2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
23-Jun-10	87	256.32	--	0.89	12.015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
30-Jun-10	88	228.285	--	0.89	12.46	0.02225	0.2225	0.0089	0.002225	0.02225	0.00356	324.85	0.0089	0.0089	0.0089	0.0445	0.0445	237.180461	0.000534	0.0006497	0.0018067	0.0009078	0.00000445	2.225E-06	0.02225	8.455E-06	
7-Jul-10	89	230.955	--	0.89	12.015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
14-Jul-10	90	276.76	--	0.88	12.76	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
21-Jul-10	91	196.24	--	0.88	11.88	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
28-Jul-10	92	205.48	--	0.88	11.88	0.0088	0.22	0.0088	0.0022	0.022	--	299.2	--	--	--	0.044	0.044	226.112392	0.00044	0.00066	0.001892	0.00088	0.0000044	0.0000022	0.022	0.00001056	
4-Aug-10	93	251.24	--	0.88	11.88	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
11-Aug-10	94	220.34	--	0.92	12.88	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
18-Aug-10	95	228.81	--	0.87	11.745	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
25-Aug-10	96	199.35	--	0.9	12.15	0.0135	0.225	0.009	0.00225	0.1035	0.00225	315	0.009	0.009	0.009	0.045	0.045	214.77906	0.001305	0.0007335	0.0020025	0.0009855	0.0000045	0.00000225	0.0225	0.0000126	
1-Sep-10	97	210.7	--	0.86	12.04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
8-Sep-10	98	226.32	--	0.92	12.88	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
15-Sep-10	99	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
22-Sep-10	100	202.1	--	0.86	12.47	--	0.215	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
29-Sep-10	101	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
6-Oct-10	102	195.22	--	0.86	12.47	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
13-Oct-10	103	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
20-Oct-10	104	227.85	--	0.93	13.95	0.00465	0.2325	0.0093	0.002325	0.04371	0.002325	297.6	0.0093	0.0093	0.0093	0.0465	0.0465	215.609619	0.0030225	0.00067425	0.00198555	0.00099045	0.00000465	2.325E-06	0.02325	1.3485E-05	
27-Oct-10	105	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
3-Nov-10	106	214.49	--	0.89	12.015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
10-Nov-10	107	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
17-Nov-10	108	196.42	--	0.92	13.34	--	0.23	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
24-Nov-10	109	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
1-Dec-10	110	197.015	--	0.91	12.74	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
8-Dec-10	111	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
15-Dec-10	112	197.925	--	0.87	12.615	0.01305	0.2175	0.0087	0.002175	0.02175	0.002175	274.05	0.0087	0.0087	0.0087	0.0435	0.0435	192.37701	0.00087	0.0006177	0.00174435	0.0007656	0.00000435	2.175E-06	0.02175	8.265E-06	
22-Dec-10	113	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
29-Dec-10	114	184.36	--																								

Appendix G: Kinetic Data, Humidity Cell Tests

Boston CND
Residue
HC-2 Tailings

Loading Calculations																										
Date	Accum. Weeks	SO4	Acidity to pH 4.5	Acidity to pH 8.3	Total Alkalinity	Fluoride	Chloride	Nitrate-N	Nitrite-N	Total Ammonia	Diss.-P	TDS	Total CN	WAD CN	Free CN	SCN	CNO	Hardness CaCO3	Al	Sb	As	Ba	Be	Bi	B	Cd
		mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
24-Aug-11	148	167.2	--	0.88	12.32	--	0.352	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
31-Aug-11	149	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7-Sep-11	150	176	--	0.88	12.32	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
14-Sep-11	151	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
21-Sep-11	152	169.65	--	0.435	12.18	0.00435	0.2175	0.0087	0.002175	0.025665	0.002175	287.1	0.0087	0.0087	0.0087	0.0435	0.0435	193.575	0.004263	0.00069165	0.0039324	0.00084825	0.00000435	2.175E-06	0.02175	0.00001218
28-Sep-11	153	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5-Oct-11	154	162.69	--	0.87	13.05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12-Oct-11	155	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
19-Oct-11	156	164.255	--	1.365	13.65	--	0.2275	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
26-Oct-11	157	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Nov-11	158	184.95	--	0.9	13.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9-Nov-11	159	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
16-Nov-11	160	166.5	--	1.35	14.85	0.00585	0.225	0.009	0.00225	0.0288	0.004545	279	0.009	0.009	0.009	0.045	0.045	203.85	0.00054	0.0006165	0.0013275	0.0007695	0.0000045	0.00000225	0.0225	0.00000495
23-Nov-11	161	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
30-Nov-11	162	153.9	--	0.9	12.6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7-Dec-11	163	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
14-Dec-11	164	176.22	--	0.89	13.35	--	0.2225	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
21-Dec-11	165	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
28-Dec-11	166	160.44	--	0.84	10.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Jan-12	167	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11-Jan-12	168	190.65	--	0.465	15.345	0.00837	0.2325	0.0093	0.002325	0.09765	0.01953	332.94	0.0093	0.0093	0.0093	0.0465	0.0465	232.965	0.000372	0.00073935	0.00142755	0.00107415	0.00000465	2.325E-06	0.02325	0.0000093
18-Jan-12	169	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
25-Jan-12	170	176.665	--	0.445	12.015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1-Feb-12	171	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8-Feb-12	172	178.815	--	0.455	11.83	--	0.2275	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
15-Feb-12	173	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
22-Feb-12	174	162.12	--	0.42	10.92	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
29-Feb-12	175	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7-Mar-12	176	215.76	--	0.435	14.355	0.008265	0.3915	0.023055	0.002175	0.11745	0.004089	308.85	--	--	--	--	--	220.98	0.0009135	0.0007395	0.001131	0.0010266	0.00000435	2.175E-06	0.02175	1.1745E-05
14-Mar-12	177	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
21-Mar-12	178	195.315	--	0.435	13.05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
28-Mar-12	179	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Apr-12	180	197.135	--	0.445	14.24	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11-Apr-12	181	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
18-Apr-12	182	184.675	--	0.445	16.465	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
25-Apr-12	183	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-May-12	184	226.38	--	0.42	14.28	0.00756	0.21	0.0084	0.0021	0.0966	0.0021	315.84	--	--	--	--	--	218.82	0.0007854	0.0007056	0.0016632	0.0010794	0.0000042	0.0000021	0.021	0.00000966
9-May-12	185	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
16-May-12	186	186.56	--	0.44	12.76	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
23-May-12	187	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
30-May-12	188	192.685	--	0.89	15.575	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6-Jun-12	189	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
13-Jun-12	190	166.43	--	0.89	12.46	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
20-Jun-12	191	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
27-Jun-12	192	154.8	--	0.43	12.47	0.00473	0.215	0.0086	0.00215	0.0989	0.002838	265.74	--	--	--	--	--	190.49	0.0008729	0.0005676	0.0011739	0.0006837	0.0000043	0.00000215	0.0215	9.159E-06
4-Jul-12	193	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11-Jul-12	194	152.04	--	0.42	11.34	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
18-Jul-12	195	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
25-Jul-12	196	163.24	--	0.3564	13.552	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1-Aug-12	197	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8-Aug-12	198	157.5	--	0.4995	12.645	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
15-Aug-12	199	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
22-Aug-12	200	155.23	--	0.5762	11.911	0.00473	0.2709	0.0086	0.00215	0.1419	0.00215	282.94	--	--	--	--	--	185.76	0.0034314	0.0005375	0.0015523	0.0006407	0.0000043	0.00000215	0.0215	0.00000688
29-Aug-12	201	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5-Sep-12	202	155.73	--	0.90915	13.2675	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12-Sep-12	203	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
19-Sep-12	204	163.8	--	1.05	12.516	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
26-Sep-12	205	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3-Oct-12	206	139.02	--	0.3486	10.164	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10-Oct-12	207	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
17-Oct-12	208	182	--	2.07935	12.103	0.00455	0.26845	0.0091	0.002275	0.0546	0.004004	281.19	--	--	--	--	--	204.75	0.00137865	0.00046865	0.0011375	0.00059605	0.00000455	2.275E-06	0.02275	5.005E-06
24-Oct-12	209	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
31-Oct-12	210	177.59	--	0.86	12.9	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Terminated																										

Appendix G: Kinetic Data, Humidity Cell Tests

Boston CND
Residue
HC-2 Tailings

Loading Calculations																															
Date	Accum. Weeks	Ca	Cr	Co	Cu	Fe	Pb	Li	Mg	Mn	Hg (CVAF)	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	Te	Tl	Th	Sn	Ti	U	V	Zn	Zr		
		mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	
22-Oct-08	0	76.16	0.00056	0.04872	0.00448	0.028	0.00056	0.0028	28.896	0.112	1.12E-05	0.0252	0.2856	0.084	7.224	0.00952	0.728	0.00014	65.52	0.196	0.00056	0.000056	0.00028	0.00056	0.00056	0.00028	0.00056	0.0028	0.0056	0.0056	
29-Oct-08	1	35.616	0.00048	0.02688	0.00192	0.024	0.00048	0.00096	11.232	0.0864	9.6E-06	0.00672	0.1392	0.072	2.64	0.00384	0.288	0.00012	16.08	0.072	0.00048	0.000048	0.00024	0.00048	0.00048	0.00024	0.00048	0.0024	0.0048	0.0048	
5-Nov-08	2	45	0.00045	0.03105	0.00225	0.0225	0.00045	0.00045	16.515	0.099	0.000009	0.004185	0.171	0.0675	2.385	0.0045	0.18	--	11.79	0.0675	0.00045	0.000045	0.000225	0.00045	0.00045	0.000225	0.00045	0.00225	0.0045	0.0045	
12-Nov-08	3	50.6	--	--	--	0.0044	--	--	19.668	--	--	--	--	--	2.332	--	--	--	9.416	--	--	--	--	--	--	--	--	--	--	--	--
19-Nov-08	4	42.0255	0.000495	0.037125	--	0.00495	0.000495	0.00099	18.8595	0.12375	9.9E-06	0.002277	0.2079	0.07425	1.5345	0.006435	0.1485	0.000124	6.4845	0.06435	0.000495	4.95E-05	0.000248	0.000495	0.000495	0.000248	0.000495	0.002475	0.00495	0.00495	
26-Nov-08	5	26.274	--	--	--	0.0087	--	--	12.1365	--	--	--	--	--	0.9135	--	--	--	3.1755	--	--	--	--	--	--	--	--	--	--	--	--
3-Dec-08	6	27.52	--	--	--	0.0129	--	--	15.007	--	--	--	--	--	0.989	--	--	--	3.139	--	--	--	--	--	--	--	--	--	--	--	--
10-Dec-08	7	35.626	--	--	--	0.0047	--	--	25.051	--	--	--	--	--	1.363	--	--	--	4.324	--	--	--	--	--	--	--	--	--	--	--	--
17-Dec-08	8	26.058	0.00043	0.02752	0.01118	0.0215	0.00043	0.00129	19.866	0.129	8.6E-06	0.000817	0.1204	0.0645	0.946	0.0086	0.1075	0.000108	2.9154	0.03483	0.00043	0.000043	0.000215	0.00043	0.00043	0.000215	0.00043	0.00258	0.0043	0.0043	
24-Dec-08	9	22.77	--	--	--	0.0045	--	--	18.45	--	--	--	--	--	0.54	--	--	--	2.025	--	--	--	--	--	--	--	--	--	--	--	--
31-Dec-08	10	19.89	--	--	--	0.0045	--	--	17.955	--	--	--	--	--	0.63	--	--	--	1.71	--	--	--	--	--	--	--	--	--	--	--	--
7-Jan-09	11	36.135	--	--	--	0.00495	--	--	41.184	--	--	--	--	--	1.089	--	--	--	3.4155	--	--	--	--	--	--	--	--	--	--	--	--
14-Jan-09	12	25.872	0.00049	0.0245	0.00098	0.0245	0.00049	0.00147	30.233	0.1274	9.8E-06	0.000294	0.0931	0.0735	0.833	0.0098	0.1225	0.000123	2.0972	0.0343	0.00049	0.000049	0.000245	0.00049	0.00049	0.000245	0.00049	0.00245	0.0049	0.0049	
21-Jan-09	13	27.293	--	--	--	0.0049	--	--	33.81	--	--	--	--	--	0.588	--	--	--	2.156	--	--	--	--	--	--	--	--	--	--	--	--
28-Jan-09	14	45.448	--	--	--	0.0046	--	--	50.14	--	--	--	--	--	1.058	--	--	--	2.576	--	--	--	--	--	--	--	--	--	--	--	--
4-Feb-09	15	30.8295	--	--	--	0.00465	--	--	35.4795	--	--	--	--	--	0.651	--	--	--	1.581	--	--	--	--	--	--	--	--	--	--	--	--
11-Feb-09	16	25.474	0.000094	0.02256	0.000705	0.0047	0.000094	0.00094	33.84	0.11703	9.4E-06	0.000141	0.07661	0.0141	0.6862	0.00893	0.0893	2.35E-05	1.2032	0.03337	0.000094	9.4E-06	0.000047	0.000094	0.000094	0.000047	0.000094	0.00141	0.00094	0.00094	
18-Feb-09	17	8.4105	--	--	--	0.00445	--	--	9.256	--	--	--	--	--	0.1335	--	--	--	0.3115	--	--	--	--	--	--	--	--	--	--	--	--
25-Feb-09	18	15.5305	--	--	--	0.00445	--	--	19.1795	--	--	--	--	--	0.11125	--	--	--	0.5785	--	--	--	--	--	--	--	--	--	--	--	--
4-Mar-09	19	20.4295	--	--	--	0.00455	--	--	26.1625	--	--	--	--	--	0.4095	--	--	--	0.728	--	--	--	--	--	--	--	--	--	--	--	--
11-Mar-09	20	14.507	0.000089	0.01602	0.0006675	0.00445	0.000089	0.000623	18.601	0.1157	8.9E-06	4.45E-05	0.0623	0.01335	0.4094	0.004895	0.06675	2.23E-05	0.52065	0.01869	0.000089	8.9E-06	4.45E-05	0.000089	0.000089	4.45E-05	0.000089	0.00089	0.00089	0.00089	
18-Mar-09	21	19.918	--	--	--	0.0046	--	--	32.66	--	--	--	--	--	0.414	--	--	--	0.506	--	--	--	--	--	--	--	--	--	--	--	--
25-Mar-09	22	15.502	--	--	--	0.0046	--	--	28.244	--	--	--	--	--	0.322	--	--	--	0.644	--	--	--	--	--	--	--	--	--	--	--	--
1-Apr-09	23	19.9025	--	--	--	0.00475	--	--	41.61	--	--	--	--	--	0.475	--	--	--	0.9025	--	--	--	--	--	--	--	--	--	--	--	--
8-Apr-09	24	20.202	0.000091	0.023205	0.0003185	0.01365	0.000091	0.001001	35.49	0.167895	9.1E-06	4.55E-05	0.078715	0.01365	0.48685	0.00728	0.15015	2.28E-05	0.6461	0.025935	0.000091	9.1E-06	4.55E-05	0.000091	0.000091	4.55E-05	0.000091	0.00182	0.00091	0.00091	
15-Apr-09	25	21.945	--	--	--	0.00475	--	--	42.6075	--	--	--	--	--	0.475	--	--	--	0.8075	--	--	--	--	--	--	--	--	--	--	--	--
22-Apr-09	26	17.424	--	--	--	0.0088	--	--	26.488	--	--	--	--	--	0.352	--	--	--	0.44	--	--	--	--	--	--	--	--	--	--	--	--
29-Apr-09	27	14.355	--	--	--	0.00435	--	--	21.3585	--	--	--	--	--	0.2175	--	--	--	0.3045	--	--	--	--	--	--	--	--	--	--	--	--
6-May-09	28	15.004	0.000088	0.0154	0.001232	0.022	0.000088	0.000704	28.732	0.11264	8.8E-06	0.000044	0.0594	0.0132	0.3388	0.004356	0.0704	0.000022	0.3828	0.01628	0.000088	8.8E-06	0.000044	0.000088	0.000088	0.000044	0.000088	0.00176	0.00088	0.00088	
13-May-09	29	16.11	--	--	--	0.0045	--	--	29.115	--	--	--	--	--	0.225	--	--	--	0.405	--	--	--	--	--	--	--	--	--	--	--	--
20-May-09	30	17.4265	--	--	--	0.00455	--	--	32.7145	--	--	--	--	--	0.273	--	--	--	0.4095	--	--	--	--	--	--	--	--	--	--	--	--
27-May-09	31	20.176	--	--	--	0.00485	--	--	37.927	--	--	--	--	--	0.3395																

Appendix G: Kinetic Data, Humidity Cell Tests

Boston CND
Residue
HC-2 Tailings

		Loading Calculations																												
Date	Accum. Weeks	Ca mg/kg/wk	Cr mg/kg/wk	Co mg/kg/wk	Cu mg/kg/wk	Fe mg/kg/wk	Pb mg/kg/wk	Li mg/kg/wk	Mg mg/kg/wk	Mn mg/kg/wk	Hg (CVAF) mg/kg/wk	Mo mg/kg/wk	Ni mg/kg/wk	P mg/kg/wk	K mg/kg/wk	Se mg/kg/wk	Si mg/kg/wk	Ag mg/kg/wk	Na mg/kg/wk	Sr mg/kg/wk	Te mg/kg/wk	Tl mg/kg/wk	Th mg/kg/wk	Sn mg/kg/wk	Ti mg/kg/wk	U mg/kg/wk	V mg/kg/wk	Zn mg/kg/wk	Zr mg/kg/wk	
24-Mar-10	74	73.53	--	--	--	0.0043	--	--	52.03	--	--	--	--	--	0.258	--	--	--	0.129	--	--	--	--	--	--	--	--	--	--	--
31-Mar-10	75	77.4	--	--	--	0.0045	--	--	58.05	--	--	--	--	--	0.225	--	--	--	0.135	--	--	--	--	--	--	--	--	--	--	--
7-Apr-10	76	70.68	4.65E-05	0.012462	0.00031155	0.00372	4.65E-06	0.001163	46.965	0.0558	9.3E-06	0.000112	0.049755	0.00093	0.27435	0.002641	0.093	3.26E-06	0.1488	0.072075	9.3E-06	5.58E-06	2.33E-06	2.79E-05	0.000233	8.37E-06	0.000093	0.001349	4.65E-05	
14-Apr-10	77	60.72	--	--	--	0.0308	--	--	40.612	--	--	--	--	--	0.176	--	--	--	0.132	--	--	--	--	--	--	--	--	--	--	--
21-Apr-10	78	65.565	--	--	--	0.00465	--	--	44.7795	--	--	--	--	--	0.1395	--	--	--	0.1395	--	--	--	--	--	--	--	--	--	--	--
28-Apr-10	79	57.8	--	--	--	0.00425	--	--	37.4	--	--	--	--	--	0.2125	--	--	--	0.1275	--	--	--	--	--	--	--	--	--	--	--
5-May-10	80	62.335	4.55E-05	0.008736	0.0002912	0.00455	4.55E-06	0.00091	38.8115	0.031896	9.1E-06	0.000141	0.034671	0.00091	0.2457	0.002266	0.091	2.28E-06	0.13195	0.06097	9.1E-06	5.01E-06	2.28E-06	1.82E-05	0.000228	5.46E-06	0.000091	0.000865	4.55E-05	
12-May-10	81	35.19	--	--	--	0.009	--	--	57.6	--	--	--	--	--	0.36	--	--	--	0.18	--	--	--	--	--	--	--	--	--	--	--
19-May-10	82	53.24	--	--	--	0.0044	--	--	32.648	--	--	--	--	--	0.132	--	--	--	0.088	--	--	--	--	--	--	--	--	--	--	--
26-May-10	83	56.7	--	--	--	0.0045	--	--	33.39	--	--	--	--	--	0.135	--	--	--	0.09	--	--	--	--	--	--	--	--	--	--	--
2-Jun-10	84	56.58	0.000092	0.008602	0.0001978	0.00184	9.66E-06	0.001104	29.808	0.032614	9.2E-06	0.000133	0.035466	0.00092	0.207	0.002121	0.092	2.3E-06	0.0966	0.06026	9.2E-06	7.36E-06	2.76E-06	2.76E-05	0.00023	6.9E-06	0.000092	0.001334	0.000046	
9-Jun-10	85	57.42	--	--	--	0.00435	--	--	31.4505	--	--	--	--	--	0.174	--	--	--	0.087	--	--	--	--	--	--	--	--	--	--	--
16-Jun-10	86	52.36	--	--	--	0.0044	--	--	29.26	--	--	--	--	--	0.132	--	--	--	0.088	--	--	--	--	--	--	--	--	--	--	--
23-Jun-10	87	52.065	--	--	--	0.00445	--	--	28.7915	--	--	--	--	--	0.178	--	--	--	0.089	--	--	--	--	--	--	--	--	--	--	--
30-Jun-10	88	52.955	0.000134	0.005474	0.0004539	0.00178	1.6E-05	0.00089	25.4985	0.021449	8.9E-06	0.000298	0.025232	0.00089	0.1869	0.001771	0.089	2.23E-06	0.09345	0.046725	8.9E-06	5.79E-06	2.23E-06	3.12E-05	0.000223	5.34E-06	0.000089	0.000846	4.45E-05	
7-Jul-10	89	54.29	--	--	--	0.00445	--	--	28.035	--	--	--	--	--	0.1335	--	--	--	0.089	--	--	--	--	--	--	--	--	--	--	--
14-Jul-10	90	58.52	--	--	--	0.0044	--	--	30.976	--	--	--	--	--	0.132	--	--	--	0.088	--	--	--	--	--	--	--	--	--	--	--
21-Jul-10	91	53.68	--	--	--	0.0044	--	--	28.688	--	--	--	--	--	0.132	--	--	--	0.088	--	--	--	--	--	--	--	--	--	--	--
28-Jul-10	92	49.72	0.000088	0.00484	0.0004268	0.0022	1.58E-05	0.00088	24.772	0.01892	8.8E-06	0.000264	0.022	0.00088	0.176	0.001408	0.0836	2.2E-06	0.088	0.044	8.8E-06	6.16E-06	2.2E-06	2.64E-05	0.00022	5.28E-06	0.000088	--	0.000044	
4-Aug-10	93	55	--	--	--	0.0044	--	--	29.48	--	--	--	--	--	0.176	--	--	--	0.132	--	--	--	--	--	--	--	--	--	--	--
11-Aug-10	94	55.2	--	--	--	0.0046	--	--	27.002	--	--	--	--	--	0.138	--	--	--	0.092	--	--	--	--	--	--	--	--	--	--	--
18-Aug-10	95	53.505	--	--	--	0.00435	--	--	25.3605	--	--	--	--	--	0.1305	--	--	--	0.087	--	--	--	--	--	--	--	--	--	--	--
25-Aug-10	96	51.3	0.000045	0.00486	0.0004095	0.0027	1.71E-05	0.000855	21.06	0.015435	0.000009	0.000257	0.021825	0.0009	0.18	0.001161	0.09	2.25E-06	0.0765	0.04815	0.000009	6.3E-06	2.25E-06	2.25E-05	0.000225	4.95E-06	0.00009	0.000765	0.000045	
1-Sep-10	97	50.74	--	--	--	0.0043	--	--	22.747	--	--	--	--	--	0.172	--	--	--	0.086	--	--	--	--	--	--	--	--	--	--	--
8-Sep-10	98	55.2	--	--	--	0.0046	--	--	24.84	--	--	--	--	--	0.138	--	--	--	0.092	--	--	--	--	--	--	--	--	--	--	--
15-Sep-10	99	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
22-Sep-10	100	50.74	--	--	0.0043	0.0129	--	--	22.274	--	--	--	--	--	0.129	--	--	--	0.086	--	--	--	--	--	--	--	--	--	--	--
29-Sep-10	101	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6-Oct-10	102	47.73	--	--	0.0043	0.0129	--	--	19.866	--	--	--	--	--	0.129	--	--	--	0.086	--	--	--	--	--	--	--	--	--	--	--
13-Oct-10	103	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
20-Oct-10	104	52.545	4.65E-05	0.004445	0.0001767	0.003255	1.91E-05	0.000791	20.5065	0.014276	1.21E-05	0.000195	0.021204	0.00279	0.1767	0.001163	0.093	2.33E-06	0.0837	0.041339	9.3E-06	5.58E-06	2.33E-06	1.86E-05	0.000233	6.98E-06	0.000093	0.00107	4.65E-05	
27-Oct-10	105	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3-Nov-10	106	52.065	--	--	--	0.00445	--	--	20.47	--	--	--	--	--	0.1335	--	--	--	0.089	--	--	--	--	--	--	--	--	--	--	--
10-Nov-10	107	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
17-Nov-10	108	52.44	--	--	--	0.0046	--	--	20.378	--	--	--	--	--	0.138	--	--	--	0.092	--	--	--	--	--	--	--	--	--	--	--
24-Nov-10	109	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			

Appendix G: Kinetic Data, Humidity Cell Tests

HC-2 Boston CND
Residue
Tailings

Loading Calculations																														
Date	Accum. Weeks	Ca mg/kg/wk	Cr mg/kg/wk	Co mg/kg/wk	Cu mg/kg/wk	Fe mg/kg/wk	Pb mg/kg/wk	Li mg/kg/wk	Mg mg/kg/wk	Mn mg/kg/wk	Hg (CVAF) mg/kg/wk	Mo mg/kg/wk	Ni mg/kg/wk	P mg/kg/wk	K mg/kg/wk	Se mg/kg/wk	Si mg/kg/wk	Ag mg/kg/wk	Na mg/kg/wk	Sr mg/kg/wk	Te mg/kg/wk	Tl mg/kg/wk	Th mg/kg/wk	Sn mg/kg/wk	Ti mg/kg/wk	U mg/kg/wk	V mg/kg/wk	Zn mg/kg/wk	Zr mg/kg/wk	
24-Aug-11	148	48.4	--	--	--	0.0044	--	--	23.232	--	--	--	--	--	0.132	--	--	--	0.132	--	--	--	--	--	--	--	--	--	--	--
31-Aug-11	149	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7-Sep-11	150	43.472	--	--	--	0.0044	--	--	20.24	--	--	--	--	--	0.132	--	--	--	0.044	--	--	--	--	--	--	--	--	--	--	--
14-Sep-11	151	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
21-Sep-11	152	45.675	0.000087	0.002667	0.00067425	0.00174	9.27E-05	0.000566	19.488	0.011789	8.7E-07	0.000152	0.017748	0.00435	0.1044	0.000474	0.087	2.18E-06	0.06525	0.030015	8.7E-06	7.4E-06	2.18E-06	0.000139	0.000218	3.05E-06	0.000087	0.003176	4.35E-05	
28-Sep-11	153	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5-Oct-11	154	49.155	--	--	--	0.00435	--	--	22.5765	--	--	--	--	--	0.1305	--	--	--	0.0435	--	--	--	--	--	--	--	--	--	--	--
12-Oct-11	155	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
19-Oct-11	156	47.775	--	--	--	0.00455	--	--	21.6125	--	--	--	--	--	0.1365	--	--	--	0.091	--	--	--	--	--	--	--	--	--	--	--
26-Oct-11	157	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Nov-11	158	49.05	--	--	--	0.0045	--	--	21.465	--	--	--	--	--	0.18	--	--	--	0.315	--	--	--	--	--	--	--	--	--	--	--
9-Nov-11	159	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
16-Nov-11	160	46.8	0.000045	0.001773	0.0002025	0.0009	2.07E-05	0.00063	21.195	0.00684	9E-07	0.000153	0.01557	0.00765	0.144	0.000572	0.09	2.25E-06	0.0855	0.03123	0.000009	1.17E-05	2.25E-06	0.000144	0.000225	3.15E-06	0.00009	0.00063	0.000045	
23-Nov-11	161	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
30-Nov-11	162	46.8	--	--	--	0.0045	--	--	20.565	--	--	--	--	--	0.18	--	--	--	0.135	--	--	--	--	--	--	--	--	--	--	--
7-Dec-11	163	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
14-Dec-11	164	51.175	--	--	--	0.00445	--	--	21.5825	--	--	--	--	--	0.2225	--	--	--	0.178	--	--	--	--	--	--	--	--	--	--	--
21-Dec-11	165	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
28-Dec-11	166	44.1	--	--	--	0.0042	--	--	19.194	--	--	--	--	--	0.21	--	--	--	0.084	--	--	--	--	--	--	--	--	--	--	--
4-Jan-12	167	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11-Jan-12	168	54.87	0.000093	0.002093	0.00020925	0.00186	2.33E-06	0.000605	23.25	0.009626	9.3E-07	0.000191	0.017066	0.00372	0.19065	0.000456	0.093	2.33E-06	0.0651	0.038456	9.3E-06	2.14E-05	2.33E-06	0.000093	0.000233	4.65E-06	0.000093	0.000698	4.65E-05	
18-Jan-12	169	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
25-Jan-12	170	45.835	--	--	--	0.00445	--	--	20.47	--	--	--	--	--	0.2225	--	--	--	0.0445	--	--	--	--	--	--	--	--	--	--	--
1-Feb-12	171	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8-Feb-12	172	46.41	--	--	--	0.00455	--	--	20.7935	--	--	--	--	--	0.1365	--	--	--	0.182	--	--	--	--	--	--	--	--	--	--	--
15-Feb-12	173	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
22-Feb-12	174	44.94	--	--	--	0.0042	--	--	20.832	--	--	--	--	--	0.21	--	--	--	0.21	--	--	--	--	--	--	--	--	--	--	--
29-Feb-12	175	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7-Mar-12	176	54.81	4.35E-05	0.001679	0.00028275	0.001305	3.22E-05	0.000566	20.358	0.007265	8.7E-07	0.000157	0.014529	0.006525	0.16095	0.000357	0.087	2.18E-06	0.0522	0.033713	8.7E-06	2.22E-05	2.18E-06	0.000087	0.000218	2.61E-06	0.000087	0.001784	4.35E-05	
14-Mar-12	177	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
21-Mar-12	178	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
28-Mar-12	179	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Apr-12	180	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11-Apr-12	181	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
18-Apr-12	182	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
25-Apr-12	183	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-May-12	184	53.76	0.000042	0.001499	0.0003486	0.001302	1.93E-05	0.00021	20.538	0.004914	8.4E-07	0.000173	0.012432	0.001638	0.1554	0.000383	0.0966	2.1E-06	0.05376	0.035322	8.4E-06	2.06E-05	2.1E-06	0.000332	0.00021	3.78E-06	0.000084	0.000626	0.000042	
9-May-12	185	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
16-May-12	186	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
23-May-12	187	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
30-May-12	188	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6-Jun-12	189	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
13-Jun-12	190	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
20-Jun-12	191	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
27-Jun-12	192	48.59	0.000043	0.001213	0.00016039	0.000602	4.6E-06	0.00049	16.813	0.005848	8.6E-07	0.000105	0.011739	0.002967	0.12341	0.000249	0.0903	2.15E-06	0.03655	0.028294	8.6E-06	2.35E-05	2.15E-06	0.000086	0.000215	2.71E-06	0.000086	0.000516	0.000043	
4-Jul-12	193	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11-Jul-12	194	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
18-Jul-12	195	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
25-Jul-12	196	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1-Aug-12	197	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8-Aug-12	198	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
15-Aug-12	199	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
22-Aug-12	200	46.01	6.88E-05	0.001402	0.00036808	0.006751	2.92E-05	0.000387	17.157	0.00774	8.6E-07	0.00012	0.012298	0.002236	0.11782	0.000214	0.086	2.58E-06	0.03698	0.028638	8.6E-06	2.19E-05	2.15E-06	0.000185	0.000215	3.87E-06	0.000267	0.000654	0.000043	
29-Aug-12	201	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5-Sep-12	202	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12-Sep-12	203	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
19-Sep-12	204	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
26-Sep-12	205	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3-Oct-12	206	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10-Oct-12	207	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
17-Oct-12	208	48.685	5.46E-05	0.000846	0.00033488	0.001775	8.65E-06	0.000455	20.3385	0.003886	9.1E-07	0.00014	0.010374	0.003276	0.088725	0.00														

Appendix G: Kinetic Data, Humidity Cell Tests

Boston Mixed
HC-16 Tailings

Date	Accum. Weeks	Concentrations																														
		Volume (ml)		pH (pH Units)	EC (µS/cm)	ORP (mV)	SO4 (mg/l)	Acidity to pH 4.5 mg CaCO3/L	Acidity to pH 8.3	Alkalinity to pH 4.5	Fluoride (mg/l)	Chloride (mg/l)	Nitrate-N (mg/l)	Nitrite-N (mg/l)	Total Ammonia (mgN/l)	Diss.-P (mgP/l)	TDS (mg/l)	Total CN (mg/l)	WAD CN (mg/l)	Free CN (mg/l)	SCN (mg/l)	CNO (mg/l)	Hardness CaCO3 (mg/l)	Al mg/l	Sb mg/l	As mg/l	Ba mg/l	Be mg/l	Bi mg/l	B mg/l	Cd mg/l	
		Input	Output																													
13-May-09	0	950	620	0.01	1	50	1	1	1	1	0.1	0.2	0.02	0.002	0.01	0.001	10	0.02	0.02	0.02	1.55	0.1	Calculation	0.005	0.001	0.001	0.001	0.001	0.001	0.001	0.05	0.0002
20-May-09	1	500	455	8.12	516	135	152	--	1	75	0.16	0.76	0.05	0.003	0.34	0.02	366	0.03	0.02	0.02	0.1	0.1	289	0.005	0.0057	0.053	0.0059	0.0002	0.0002	0.08	0.00004	
27-May-09	2	500	450	8.12	468	135	166	--	1	75	0.08	0.28	0.05	0.004	0.31	0.02	374	0.02	0.02	0.02	0.1	0.1	256	0.005	0.0031	0.022	0.0058	0.0002	0.0002	0.05	0.00004	
3-Jun-09	3	500	460	7.87	567	155	279	--	3	59	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
10-Jun-09	4	500	475	8.02	1100	125	524	--	1	100	0.1	0.4	0.1	0.004	0.31	0.02	968	0.02	0.02	0.02	0.1	0.1	750	0.002	0.0029	0.013	0.013	0.0002	0.0002	0.05	0.00004	
17-Jun-09	5	500	430	7.77	719	140	367	--	3	71	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
24-Jun-09	6	500	455	7.75	834	135	442	--	3	76	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
1-Jul-09	7	500	500	7.72	757	145	322	--	3	74	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
8-Jul-09	8	500	420	8.09	1160	140	610	--	3	83	0.25	1	0.25	0.002	0.46	0.02	900	0.02	0.02	0.02	0.1	0.1	693	0.001	0.0018	0.0092	0.0095	0.0002	0.0002	0.04	0.00004	
15-Jul-09	9	500	490	7.92	805	130	466	--	4	97	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
22-Jul-09	10	500	480	7.91	586	130	288	--	4	81	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
29-Jul-09	11	500	460	7.94	383	150	151	--	3	55	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
5-Aug-09	12	500	455	8.13	1230	160	781	--	3	88	0.25	1	0.25	0.003	0.52	0.02	1260	0.02	0.02	0.02	0.1	0.1	907	0.002	0.0021	0.015	0.011	0.0002	0.0002	0.04	0.00004	
12-Aug-09	13	500	465	8.03	550	130	246	--	1	61	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
19-Aug-09	14	500	430	8.11	1482	125	783	--	2	91	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
26-Aug-09	15	500	470	8.11	634	140	250	--	2	63	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
2-Sep-09	16	500	455	8.16	680	140	291	--	1	102	0.25	1	0.25	0.002	0.3	0.02	516	0.02	0.02	0.02	0.1	0.1	406	0.003	0.0017	0.015	0.0042	0.0002	0.0002	0.03	0.00004	
9-Sep-09	17	500	440	8.06	390	150	136	--	1	64	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
16-Sep-09	18	500	435	8.18	503	140	217	--	1	87	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
23-Sep-09	19	500	445	8.12	729	150	306	--	1	100	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
30-Sep-09	20	500	460	8.16	541	150	215	--	1	100	0.05	0.2	0.05	0.002	0.27	0.02	408	0.02	0.02	0.02	0.1	0.1	309	0.002	0.002	0.021	0.0046	0.0001	0.0001	0.026	0.00001	
7-Oct-09	21	500	405	8.06	890	160	419	--	3	136	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
14-Oct-09	22	500	465	8.14	514	170	158	--	1	99	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
21-Oct-09	23	500	460	8.1	443	140	128	--	2	106	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
28-Oct-09	24	500	460	8.11	322	145	104	--	3	70	0.05	0.2	0.05	0.002	0.18	0.02	215	0.02	0.02	0.02	0.1	0.1	191	0.003	0.0017	0.022	0.0015	0.0001	0.0001	0.024	0.00001	
4-Nov-09	25	500	430	8.12	364	140	126	--	2	85	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
11-Nov-09	26	500	455	8.18	344	140	121	--	1	73	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
18-Nov-09	27	500	425	8.2	335	130	112	--	1	77	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
25-Nov-09	28	500	450	8.16	404	135	142	--	1	70	0.05	0.2	0.05	0.002	0.14	0.02	268	0.02	0.02	0.02	0.1	0.1	201	0.004	0.0017	0.024	0.0018	0.0001	0.0001	0.014	0.00001	
2-Dec-09	29	500	455	8.1	360	130	118	--	1	79	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
9-Dec-09	30	500	465	8.19	363	135	107	--	1	77	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
16-Dec-09	31	500	430	8.17	408	130	124	--	1	92	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
23-Dec-09	32	500	420	8.21	436	125	142	--	1	100	0.05	0.2	0.05	0.002	0.16	0.02	317	0.02	0.02	0.02	0.1	0.1	245.9127	0.002	0.002	0.024	0.0022	0.0001	0.0001	0.015	0.00001	
30-Dec-09	33	500	435	8.23	411	130	129	--	1	93	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
6-Jan-10	34	500	470	8.17	393	150	110	--	1	116	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
13-Jan-10	35	500	460	8.12	248	145	51																									

Appendix G: Kinetic Data, Humidity Cell Tests

HC-16 Boston Mixed Tailings

Concentrations																															
Date	Accum. Weeks	Volume (ml)		pH (pH Units)	EC (µS/cm)	ORP (mV)	SO4 (mg/l)	Acidity to pH 4.5	Acidity to pH 8.3	Alkalinity to pH 4.5	Fluoride (mg/l)	Chloride (mg/l)	Nitrate-N (mg/l)	Nitrite-N (mg/l)	Total Ammonia (mgN/l)	Diss.-P (mgP/l)	TDS (mg/l)	Total CN (mg/l)	WAD CN (mg/l)	Free CN (mg/l)	SCN (mg/l)	CNO (mg/l)	Hardness CaCO3 (mg/l)	Al mg/l	Sb mg/l	As mg/l	Ba mg/l	Be mg/l	Bi mg/l	B mg/l	Cd mg/l
		Input	Output					mg CaCO3/L																							
1-Dec-10	81	5	5	0.01	1	50	1	1	1	1	0.1	0.2	0.02	0.002	0.01	0.001	10	0.02	0.02	0.02	--	--	Calculation	0.005	0.001	0.001	0.001	0.001	0.001	0.05	0.0002
8-Dec-10	82	500	440	8.24	244	135	34	--	1	86	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
15-Dec-10	83	500	450	8.22	253	130	32	--	1	87	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
22-Dec-10	84	500	440	8.2	249	130	32	--	1	89	--	0.5	--	--	--	--	--	--	--	--	--	--	124	0.0031	0.00111	0.0103	0.00073	0.00001	5E-06	0.05	0.000005
29-Dec-10	85	500	445	8.21	263	130	34	--	1	92	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5-Jan-11	86	500	440	8.23	237	130	33	--	1	88	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12-Jan-11	87	500	450	8.18	241	120	32	--	1	81	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
19-Jan-11	88	500	445	8.05	234	140	34	--	1	82	0.05	0.5	0.02	0.005	0.037	0.005	120	0.02	0.02	0.02	0.1	0.1	121	0.0029	0.00113	0.0103	0.00078	0.00001	5E-06	0.05	0.000005
26-Jan-11	89	500	435	8.22	256	130	35	--	1	89	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Feb-11	90	500	450	8.19	234	155	36	--	1	85	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9-Feb-11	91	500	425	8.16	228	140	35	--	1	81	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
16-Feb-11	92	500	460	8.23	251	135	33	--	1	89	--	0.5	--	--	--	--	--	--	--	--	--	--	120	0.003	0.00108	0.00937	0.00073	0.00001	5E-06	0.05	0.000005
23-Feb-11	93	500	445	8.22	234	130	32	--	1	89	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Mar-11	94	500	485	8.19	229	140	30	--	1	88	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9-Mar-11	95	500	430	8.2	210	120	31	--	1	75	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
16-Mar-11	96	500	435	8.02	225	140	34	--	1	78	0.05	0.5	0.02	0.005	0.089	0.008	110	0.02	0.02	0.02	0.1	0.1	112	0.0045	0.00091	0.0088	0.00092	0.00001	5E-06	0.05	0.000005
23-Mar-11	97	500	425	8.24	222	140	34	--	1	78	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
30-Mar-11	98	500	445	8.19	222	135	32	--	1	83	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6-Apr-11	99	500	445	8.27	250	95	34	--	1	87	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
13-Apr-11	100	500	465	8.1	251	90	30	--	1	87	--	0.5	--	--	--	--	--	--	--	--	--	--	117	0.0043	0.00092	0.00898	0.00127	0.00001	5E-06	0.05	0.000005
20-Apr-11	101	500	490	8.01	248	80	27	--	2	90	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
27-Apr-11	102	500	435	8.2	236	120	28	--	2	83	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-May-11	103	500	425	8.19	235	125	32	--	1	84	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11-May-11	104	500	480	8.33	269	85	30	--	--	92	0.01	0.5	0.02	0.005	0.16	0.008	120	0.02	0.02	0.02	0.1	0.1	127	0.003	0.00093	0.00829	0.00088	0.00001	5E-06	0.05	0.000005
18-May-11	105	500	415	8.18	252	145	32	--	1	93	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
25-May-11	106	500	465	8.26	236	140	29	--	1	84	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1-Jun-11	107	500	430	8.25	237	95	28	--	1	84	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8-Jun-11	108	500	465	8.26	252	150	30	--	1	91	--	0.5	--	--	--	--	--	--	--	--	--	--	123	0.0051	0.0009	0.008	0.00233	0.00001	5E-06	0.05	0.000005
15-Jun-11	109	500	430	8.35	249	150	32	--	--	93	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
22-Jun-11	110	500	425	8.35	217	145	25	--	--	81	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
29-Jun-11	111	500	485	8.32	242	140	30	--	--	90	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6-Jul-11	112	500	435	8.19	181	155	21	--	1	70	0.01	0.5	0.02	0.005	0.22	0.007	98	0.02	0.02	0.02	0.1	0.1	89.8	0.004	0.00061	0.00734	0.00081	0.00001	5E-06	0.05	0.000005
13-Jul-11	113	500	415	8.19	203	170	27	--	1	70	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
20-Jul-11	114	500	440	8.18	237	160	36	--	1	83	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
27-Jul-11	115	500	480	8.3	266	130	35	--	--	96	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3-Aug-11	116	500	440	8.24	228	130	23	--	1	84	--	0.9	--	--	--	--	--	--	--	--	--	--	114	0.0045	0.00071	0.00825	0.00055	0.00001	5E-06	0.05	0.000005
10-Aug-11	117	500	465	8.25	219	130	27	--	1	78	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
17-Aug-11	118	500	450	8.24	230	140	25	--	1	78	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
24-Aug-11	119	500	440	8.25	176	145	21	--	1	64	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
31-Aug-11	120	500	480	8.24	213	135	27	--	1	68	0.01	0.8	0.02	0.005	0.057	0.007	110	0.02	0.02	0.02	0.1	0.1	98	0.0042	0.00069	0.00703	0.00048	0.00001	5E-06	0.05	0.000005
7-Sep-11	121	500	445	8.28	232	135	31	--	1	83	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
14-Sep-11	122	500	445	8.2	220	135	27	--	1	80	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
21-Sep-11	123	500	460	8.15	215	155	26	--	1	78	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
28-Sep-11	124	500	425	8.05	201	145	21.1	--	1	68	--	3.3	--	--	--	--	--	--	--	--	--	--	92	0.0095	0.00058	0.00659	0.00042	0.00001	5E-06	0.05	0.000006
5-Oct-11	125	500	440	8.13	206	160	25.1	--	1	64	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12-Oct-11	126	500	475	8.2	255	160	31.2	--	1	80	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
19-Oct-11	127	500	445	8.13	216	175	25	--	1	71	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
26-Oct-11	128	500	475	8.1	229	200	29.1	--	1	73	0.01	0.6	0.02	0.005	0.053	0.005	110	0.02	0.02	0.02	0.1	0.1	112	0.0068	0.00062	0.00651	0.00055	0.00001	5E-06	0.05	0.000005
2-Nov-11	129	500	420	8.09	228	210	23.8	--	1	71	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9-Nov-11	130	500	470	8.19	219	230	23.4	--	1	73	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
16-Nov-11	131	500	450	8.32	224	240	28.4	--	--	74	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
23-Nov-11	132	500	470	8.28	260	260	30.4	--	1	81	--	0.5	--	--	--	--	--	--	--	--	--	--	112	0.0026	0.00067	0.00681	0.00148	0.00001	5E-06	0.05	0.000005
30-Nov-11	133	500	455	8.18	220	160	24.7	--	1	78	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7-Dec-11	134	500	445	8.11	213	160	23.4	--	1	77	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
14-Dec-11	135	500	470	8.19	253	110	28.9	--	1	88	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
21-Dec-11	136	500	435	8.11	216	120	22.8	--	1	73	0.01	0.5	0.02	0.005	0.2	0.014	104	0.02	0.02	0.02	0.1	0.1	95.5	0.0043	0.00061	0.0069					

Appendix G: Kinetic Data, Humidity Cell Tests

Boston Mixed
HC-16 Tailings

Concentrations																														
Date	Accum. Weeks	Ca mg/l	Cr mg/l	Co mg/l	Cu mg/l	Fe mg/l	Pb mg/l	Li mg/l	Mg mg/l	Mn mg/l	Hg mg/l	Mo mg/l	Ni mg/l	P mg/l	K mg/l	Se mg/l	Si mg/l	Ag mg/l	Na mg/l	Sr mg/l	Te mg/l	Tl mg/l	Th mg/l	Sn mg/l	Ti mg/l	U mg/l	V mg/l	Zn mg/l	Zr mg/l	
13-May-09	0	138	0.001	0.001	0.001	0.05	0.001	0.001	0.05	0.001	0.000002	0.0005	0.001	0.15	0.1	0.001	0.25	0.00025	0.05	0.001	0.001	0.0001	0.0005	0.001	0.0001	0.0005	0.001	0.005	0.01	
20-May-09	1	69	0.0002	0.034	0.0032	0.03	0.0002	0.0026	28.3	0.129	0.00002	0.032	0.15	0.03	4.62	0.0098	1.11	0.00022	13.6	0.291	0.0002	0.00002	0.0001	0.0003	0.0002	0.0001	0.0002	0.004	0.002	
27-May-09	2	65.7	0.0002	0.036	0.0025	0.02	0.0002	0.002	23.9	0.216	0.00002	0.013	0.192	0.03	1.67	0.002	0.5	0.00005	1.29	0.107	0.0002	0.00002	0.0001	0.0002	0.0002	0.0001	0.0002	0.002	0.002	
3-Jun-09	3	82.2	--	--	--	0.01	--	--	32.1	--	--	--	--	--	1.3	--	--	--	1.1	--	--	--	--	--	--	--	--	--	--	--
10-Jun-09	4	184	0.0002	0.106	0.0018	0.01	0.0002	0.0035	70.5	0.625	0.00002	0.0078	0.548	0.03	2.19	0.0069	0.67	0.00005	1.28	0.269	0.0002	0.00002	0.0001	0.0002	0.0002	0.0001	0.0002	0.002	0.002	
17-Jun-09	5	121	--	--	--	0.01	--	--	45.2	--	--	--	--	--	1.4	--	--	--	0.9	--	--	--	--	--	--	--	--	--	--	--
24-Jun-09	6	138	--	--	--	0.01	--	--	50	--	--	--	--	--	1.3	--	--	--	0.7	--	--	--	--	--	--	--	--	--	--	--
1-Jul-09	7	109	--	--	--	0.01	--	--	42.2	--	--	--	--	--	1.1	--	--	--	0.8	--	--	--	--	--	--	--	--	--	--	--
8-Jul-09	8	168	0.0002	0.052	0.0013	0.01	0.0002	0.0027	66.4	0.384	0.00002	0.0042	0.235	0.03	1.78	0.0028	0.49	0.00005	0.77	0.187	0.0002	0.00002	0.0001	0.0002	0.0002	0.0001	0.0002	0.002	0.002	
15-Jul-09	9	130	--	--	--	0.01	--	--	53.2	--	--	--	--	--	1.7	--	--	--	0.8	--	--	--	--	--	--	--	--	--	--	--
22-Jul-09	10	81.2	--	--	--	0.01	--	--	35.3	--	--	--	--	--	1.3	--	--	--	0.6	--	--	--	--	--	--	--	--	--	--	--
29-Jul-09	11	50.5	--	--	--	0.01	--	--	21	--	--	--	--	--	0.8	--	--	--	0.3	--	--	--	--	--	--	--	--	--	--	--
5-Aug-09	12	204	0.0002	0.036	0.0015	0.01	0.0002	0.0027	96.2	0.244	0.00002	0.0072	0.135	0.12	2.02	0.0087	0.59	0.00005	0.9	0.218	0.0002	0.00002	0.0001	0.0002	0.0002	0.0001	0.0002	0.001	0.002	
12-Aug-09	13	72.6	--	--	--	0.01	--	--	34.3	--	--	--	--	--	1.1	--	--	--	0.1	--	--	--	--	--	--	--	--	--	--	--
19-Aug-09	14	201	--	--	--	0.01	--	--	99.7	--	--	--	--	--	1.5	--	--	--	0.7	--	--	--	--	--	--	--	--	--	--	--
26-Aug-09	15	82	--	--	--	0.01	--	--	42.4	--	--	--	--	--	1.1	--	--	--	0.4	--	--	--	--	--	--	--	--	--	--	--
2-Sep-09	16	85.3	0.0003	0.021	0.0012	0.01	0.0002	0.0018	46.8	0.159	0.00002	0.0034	0.081	0.03	1.03	0.0016	0.57	0.00005	0.39	0.085	0.0002	0.00002	0.0001	0.0002	0.0002	0.0001	0.0002	0.003	0.002	
9-Sep-09	17	45.5	--	--	--	0.01	--	--	24.4	--	--	--	--	--	0.7	--	--	--	0.3	--	--	--	--	--	--	--	--	--	--	--
16-Sep-09	18	61.5	--	--	--	0.01	--	--	35	--	--	--	--	--	0.8	--	--	--	0.2	--	--	--	--	--	--	--	--	--	--	--
23-Sep-09	19	90.4	--	--	--	0.01	--	--	55.7	--	--	--	--	--	0.9	--	--	--	0.4	--	--	--	--	--	--	--	--	--	--	--
30-Sep-09	20	62.2	0.0004	0.012	0.001	0.01	0.00005	0.002	37.2	0.076	0.00002	0.0044	0.046	0.015	0.82	0.0016	0.56	0.00004	0.37	0.065	0.0002	0.00002	0.00005	0.0001	0.0003	0.00005	0.0001	0.001	0.0001	
7-Oct-09	21	114	--	--	--	0.01	--	--	66.6	--	--	--	--	--	1	--	--	--	0.4	--	--	--	--	--	--	--	--	--	--	--
14-Oct-09	22	60.9	--	--	--	0.01	--	--	34.7	--	--	--	--	--	0.6	--	--	--	0.2	--	--	--	--	--	--	--	--	--	--	--
21-Oct-09	23	52.7	--	--	--	0.01	--	--	30	--	--	--	--	--	0.7	--	--	--	0.3	--	--	--	--	--	--	--	--	--	--	--
28-Oct-09	24	34.6	0.0002	0.0042	0.0027	0.01	0.00005	0.0017	25.3	0.031	0.00002	0.0046	0.015	0.015	0.58	0.0012	0.42	0.00004	0.24	0.035	0.0002	0.00002	0.00005	0.0001	0.0002	0.00005	0.0001	0.002	0.0001	
4-Nov-09	25	40.4	--	--	--	0.01	--	--	26.1	--	--	--	--	--	0.5	--	--	--	0.2	--	--	--	--	--	--	--	--	--	--	--
11-Nov-09	26	36.8	--	--	--	0.01	--	--	25.2	--	--	--	--	--	0.5	--	--	--	0.2	--	--	--	--	--	--	--	--	--	--	--
18-Nov-09	27	38.6	--	--	--	0.01	--	--	25.9	--	--	--	--	--	0.4	--	--	--	0.2	--	--	--	--	--	--	--	--	--	--	--
25-Nov-09	28	43.2	0.0002	0.0042	0.0025	0.01	0.00005	0.0006	22.5	0.021	0.00002	0.0046	0.015	0.015	0.51	0.0023	0.32	0.00004	0.17	0.038	0.0002	0.00002	0.00011	0.0001	0.0002	0.00005	0.0001	0.001	0.0001	
2-Dec-09	29	38	--	--	--	0.01	--	--	26.7	--	--	--	--	--	0.4	--	--	--	0.2	--	--	--	--	--	--	--	--	--	--	--
9-Dec-09	30	37.3	--	--	--	0.01	--	--	27.3	--	--	--	--	--	0.4	--	--	--	0.2	--	--	--	--	--	--	--	--	--	--	--
16-Dec-09	31	43.4	--	--	--	0.01	--	--	32.2	--	--	--	--	--	0.5	--	--	--	0.2	--	--	--	--	--	--	--	--	--	--	--
23-Dec-09	32	45.9	0.0002	0.0055	0.0008	0.01	0.00005	0.0016	31.9	0.03	0.00002	0.0045	0.019	0.04	0.56	0.0031	0.51	0.00004	0.23	0.041	0.0002	0.00002	0.00005	0.0001	0.0002	0.00005	0.0001	0.001	0.0001	
30-Dec-09	33	44.2	--	--	--	0.01	--	--	34	--	--	--	--	--	0.4	--	--	--	0.2	--	--	--	--	--	--	--	--	--	--	--
6-Jan-10	34	41	--	--	--	0.01	--	--	30.5	--	--	--	--	--	0.4	--	--	--	0.2	--	--	--	--	--	--	--	--	--	--	--
13-Jan-10	35	25.1	--	--	--	0.01	--	--	18.8	--	--	--	--	--	0.3	--	--	--	0.2											

Appendix G: Kinetic Data, Humidity Cell Tests

Boston Mixed
HC-16 Tailings

Concentrations																														
Date	Accum. Weeks	Ca mg/l	Cr mg/l	Co mg/l	Cu mg/l	Fe mg/l	Pb mg/l	Li mg/l	Mg mg/l	Mn mg/l	Hg mg/l	Mo mg/l	Ni mg/l	P mg/l	K mg/l	Se mg/l	Si mg/l	Ag mg/l	Na mg/l	Sr mg/l	Te mg/l	Tl mg/l	Th mg/l	Sn mg/l	Ti mg/l	U mg/l	V mg/l	Zn mg/l	Zr mg/l	
1-Dec-10	81	0.05	0.001	0.001	0.001	0.05	0.001	0.001	0.05	0.001	0.000002	0.0005	0.001	0.15	0.1	0.001	0.25	0.00025	0.05	0.001	0.001	0.0001	0.0005	0.001	0.001	0.0005	0.001	0.005	0.01	
8-Dec-10	82	18.9	--	--	--	0.01	--	--	--	--	--	--	--	--	0.3	17.1	--	--	--	0.1	--	--	--	--	--	--	--	--	--	--
15-Dec-10	83	19.6	--	--	--	0.01	--	--	18	--	--	--	--	--	0.3	--	--	--	0.2	--	--	--	--	--	--	--	--	--	--	--
22-Dec-10	84	19.2	--	--	--	0.01	--	--	17.2	--	--	--	--	--	0.3	--	--	--	0.1	--	--	--	--	--	--	--	--	--	--	--
29-Dec-10	85	20.7	0.0001	0.000834	0.00034	0.005	0.000007	0.0006	17.7	0.0161	0.000002	0.00173	0.00284	0.003	0.21	0.00125	0.4	0.000005	0.07	0.0172	0.00002	0.000007	0.000005	0.00002	0.0005	0.000012	0.0002	0.0002	0.0001	
5-Jan-11	86	20.9	--	--	--	0.01	--	--	19.1	--	--	--	--	--	0.3	--	--	--	0.1	--	--	--	--	--	--	--	--	--	--	--
12-Jan-11	87	20.6	--	--	--	0.01	--	--	18.3	--	--	--	--	--	0.3	--	--	--	0.1	--	--	--	--	--	--	--	--	--	--	--
19-Jan-11	88	19.8	--	--	--	0.01	--	--	17.4	--	--	--	--	--	0.3	--	--	--	0.1	--	--	--	--	--	--	--	--	--	--	--
26-Jan-11	89	20.8	0.0004	0.000699	0.00093	0.002	0.000018	0.0005	16.8	0.0151	0.000002	0.00182	0.00238	0.002	0.2	0.00118	0.4	0.000005	0.07	0.0178	0.00002	0.000006	0.000005	0.00005	0.0005	0.000007	0.0002	0.0016	0.0001	
2-Feb-11	90	21.8	--	--	--	0.01	--	--	19.6	--	--	--	--	--	0.5	--	--	--	0.1	--	--	--	--	--	--	--	--	--	--	--
9-Feb-11	91	19.6	--	--	--	0.01	--	--	17.4	--	--	--	--	--	1	--	--	--	0.7	--	--	--	--	--	--	--	--	--	--	--
16-Feb-11	92	19.5	--	--	--	0.01	--	--	17	--	--	--	--	--	0.3	--	--	--	0.1	--	--	--	--	--	--	--	--	--	--	--
23-Feb-11	93	19.4	0.0001	0.000757	0.00076	0.003	0.000012	0.0005	17.4	0.017	0.000002	0.00151	0.00276	0.002	0.2	0.00134	0.4	0.000005	0.07	0.0187	0.00002	0.000007	0.000005	0.00003	0.0005	0.000011	0.0002	0.0001	0.0001	
2-Mar-11	94	20.7	--	--	--	0.01	--	--	18.2	--	--	--	--	--	0.3	--	--	--	0.1	--	--	--	--	--	--	--	--	--	--	--
9-Mar-11	95	20.2	--	--	--	0.01	--	--	17.2	--	--	--	--	--	0.3	--	--	--	0.1	--	--	--	--	--	--	--	--	--	--	--
16-Mar-11	96	17.9	--	--	--	0.01	--	--	15.2	--	--	--	--	--	0.3	--	--	--	0.1	--	--	--	--	--	--	--	--	--	--	--
23-Mar-11	97	19.2	0.0001	0.000595	0.00025	0.002	0.000008	0.0005	15.6	0.0124	0.000002	0.00144	0.00197	0.004	0.18	0.00094	0.4	0.000005	0.07	0.0167	0.00002	0.000007	0.000005	0.00002	0.0005	0.000005	0.0002	0.0001	0.0001	
30-Mar-11	98	17.6	--	--	--	0.01	--	--	15.2	--	--	--	--	--	0.3	--	--	--	0.1	--	--	--	--	--	--	--	--	--	--	--
6-Apr-11	99	18.1	--	--	--	0.01	--	--	16.4	--	--	--	--	--	0.3	--	--	--	0.1	--	--	--	--	--	--	--	--	--	--	--
13-Apr-11	100	20.3	--	--	--	0.01	--	--	18	--	--	--	--	--	0.3	--	--	--	0.1	--	--	--	--	--	--	--	--	--	--	--
20-Apr-11	101	20.2	0.0001	0.000608	0.00027	0.002	0.000007	0.0005	16.3	0.0141	0.000002	0.0014	0.00205	0.012	0.19	0.00082	0.4	0.000005	0.07	0.0264	0.00002	0.000005	0.000005	0.00004	0.0005	0.000009	0.0002	0.0002	0.0001	
27-Apr-11	102	21.2	--	--	--	0.01	--	--	18.3	--	--	--	--	--	0.5	--	--	--	0.1	--	--	--	--	--	--	--	--	--	--	--
4-May-11	103	19.6	--	--	--	0.01	--	--	16.8	--	--	--	--	--	0.3	--	--	--	0.1	--	--	--	--	--	--	--	--	--	--	--
11-May-11	104	18.8	--	--	--	0.01	--	--	15.8	--	--	--	--	--	0.3	--	--	--	0.4	--	--	--	--	--	--	--	--	--	--	--
18-May-11	105	21.7	0.0001	0.000597	0.00033	0.001	0.00001	0.0006	17.7	0.015	0.000002	0.00142	0.00214	0.01	0.19	0.0007	0.5	0.000005	0.09	0.0184	0.00002	0.000008	0.000005	0.00005	0.0005	0.000014	0.0002	0.0006	0.0001	
25-May-11	106	21.8	--	--	--	0.01	--	--	19.4	--	--	--	--	--	0.3	--	--	--	0.1	--	--	--	--	--	--	--	--	--	--	--
1-Jun-11	107	20.8	--	--	--	0.01	--	--	17.7	--	--	--	--	--	0.3	--	--	--	0.1	--	--	--	--	--	--	--	--	--	--	--
8-Jun-11	108	18.7	--	--	--	0.01	--	--	16.5	--	--	--	--	--	3.7	--	--	--	0.4	--	--	--	--	--	--	--	--	--	--	--
15-Jun-11	109	20.4	0.0001	0.000561	0.00044	0.001	0.000009	0.0005	17.6	0.0133	0.000002	0.00148	0.00204	0.01	0.17	0.00075	0.5	0.000005	0.08	0.0288	0.00002	0.000007	0.000005	0.00005	0.0005	0.000011	0.0002	0.0048	0.0001	
22-Jun-11	110	20.8	--	--	--	0.01	--	--	17.9	--	--	--	--	--	0.3	--	--	--	0.1	--	--	--	--	--	--	--	--	--	--	--
29-Jun-11	111	19.3	--	--	--	0.01	--	--	15.7	--	--	--	--	--	0.4	--	--	--	0.1	--	--	--	--	--	--	--	--	--	--	--
6-Jul-11	112	22.6	--	--	--	0.01	--	--	19.2	--	--	--	--	--	0.3	--	--	--	0.1	--	--	--	--	--	--	--	--	--	--	--
13-Jul-11	113	16.5	0.0001	0.000448	0.00028	0.002	0.000011	0.0005	11.8	0.0123	0.000002	0.00096	0.00138	0.007	0.14	0.0005	0.4	0.000005	0.08	0.0138	0.00002	0.000005	0.000005	0.00004	0.0005	0.000005	0.0002	0.0009	0.0001	
20-Jul-11	114	18.2	--	--	--	0.01	--	--	14.5	--	--	--	--	--	0.3	--	--	--	0.1	--	--	--	--	--	--	--	--	--	--	--
27-Jul-11	115	20.4	--	--	--	0.01	--	--	17.8	--	--	--	--	--	0.3	--	--	--	0.1	--	--	--	--	--	--	--	--	--	--	--
3-Aug-11	116	23.7	--	--	--	0.01	--	--	20.9	--	--	--	--	--	0.3	--	--	--	0.2	--	--	--	--	--	--	--	--	--	--	--
10-Aug-11	117	19.7	0.0001	0.000478	0.00027	0.002	0.000022	0.0005	15.8	0.0106	0.000002	0.00126	0.00167	0.017	0.17	0.0008	0.5	0.000005	0.09	0.0167	0.00002	0.000005	0.000005	0.00004	0.0005	0.000008	0.0002	0.001	0.0001	
17-Aug-11	118	18.3	--	--	--	0.01	--	--	15.1	--	--	--	--	--	0.3	--	--	--	0.2	--	--	--	--	--	--	--	--	--	--	--
24-Aug-11	119	15.9	--	--	--	0.01	--	--	13.3	--	--	--	--	--	0.3	--	--	--	0.1	--	--	--	--	--	--	--	--	--	--	--

Appendix G: Kinetic Data, Humidity Cell Tests

Boston Mixed
HC-16 Tailings

Loading Calculations																														
Date	Accum. Weeks	SO4 mg/kg/wk	Acidity to pH 4.5 mg/kg/wk	Acidity to pH 8.3 mg/kg/wk	Total Alkalinity (mg CaCO3/l) mg/kg/wk	Fluoride mg/kg/wk	Chloride mg/kg/wk	Nitrate-N mg/kg/wk	Nitrite-N mg/kg/wk	Total Ammonia mg/kg/wk	Diss.-P mg/kg/wk	TDS mg/kg/wk	Total CN mg/kg/wk	WAD CN mg/kg/wk	Free CN mg/kg/wk	SCN mg/kg/wk	CNO mg/kg/wk	Hardness CaCO3 mg/kg/wk	Al mg/kg/wk	Sb mg/kg/wk	As mg/kg/wk	Ba mg/kg/wk	Be mg/kg/wk	Bi mg/kg/wk	B mg/kg/wk	Cd mg/kg/wk	Ca mg/kg/wk	Cr mg/kg/wk	Co mg/kg/wk	
13-May-09	0	337.9	--	1.86	50.84	0.248	3.8254	0.062	0.01488	0.3844	0.0124	511.5	0.0744	0.0124	0.0124	0.961	0.062	358.36	0.00372	0.005828	0.06696	0.00806	0.000124	0.000124	0.093	0.0000248	85.56	0.000124	0.031	
20-May-09	1	69.16	--	0.455	34.125	0.0728	0.3458	0.02275	0.001365	0.1547	0.0091	166.53	0.01365	0.0091	0.0091	0.0455	0.0455	131.495	0.002275	0.0025935	0.024115	0.0026845	0.000091	0.000091	0.0364	0.0000182	31.395	0.000091	0.01547	
27-May-09	2	74.7	--	0.45	33.75	0.036	0.126	0.0225	0.0018	0.1395	0.009	168.3	0.009	0.009	0.009	0.045	0.045	115.2	0.00225	0.001395	0.0099	0.00261	0.00009	0.00009	0.0225	0.000018	29.565	0.00009	0.0162	
3-Jun-09	3	128.34	--	1.38	27.14	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	37.812	--	--
10-Jun-09	4	248.9	--	0.475	47.5	0.0475	0.19	0.0475	0.0019	0.14725	0.0095	459.8	0.0095	0.0095	0.0095	0.0475	0.0475	356.25	0.00095	0.0013775	0.006175	0.006175	0.000095	0.000095	0.02375	0.000019	87.4	0.000095	0.05035	
17-Jun-09	5	157.81	--	1.29	30.53	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	52.03	--	--
24-Jun-09	6	201.11	--	1.365	34.58	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	62.79	--	--
1-Jul-09	7	161	--	1.5	37	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	54.5	--	--
8-Jul-09	8	256.2	--	1.26	34.86	0.105	0.42	0.105	0.00084	0.1932	0.0084	378	0.0084	0.0084	0.0084	0.042	0.042	291.06	0.00042	0.000756	0.003864	0.00399	0.000084	0.000084	0.0168	0.0000168	70.56	0.000084	0.02184	
15-Jul-09	9	228.34	--	1.96	47.53	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	63.7	--	--
22-Jul-09	10	138.24	--	1.92	38.88	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	38.976	--	--
29-Jul-09	11	69.46	--	1.38	25.3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	23.23	--	--
5-Aug-09	12	355.355	--	1.365	40.04	0.11375	0.455	0.11375	0.001365	0.2366	0.0091	573.3	0.0091	0.0091	0.0091	0.0455	0.0455	412.685	0.00091	0.0009555	0.006825	0.005005	0.000091	0.000091	0.0182	0.0000182	92.82	0.000091	0.01638	
12-Aug-09	13	114.39	--	0.465	28.365	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	33.759	--	--
19-Aug-09	14	336.69	--	0.86	39.13	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	86.43	--	--
26-Aug-09	15	117.5	--	0.94	29.61	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	38.54	--	--
2-Sep-09	16	132.405	--	0.455	46.41	0.11375	0.455	0.11375	0.00091	0.1365	0.0091	234.78	0.0091	0.0091	0.0091	0.0455	0.0455	184.73	0.001365	0.0007735	0.006825	0.001911	0.000091	0.000091	0.01365	0.0000182	38.8115	0.000137	0.009555	
9-Sep-09	17	59.84	--	0.44	28.16	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	20.02	--	--
16-Sep-09	18	94.395	--	0.435	37.845	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	26.7525	--	--
23-Sep-09	19	136.17	--	0.445	44.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	40.228	--	--
30-Sep-09	20	98.9	--	0.46	46	0.023	0.092	0.023	0.00092	0.1242	0.0092	187.68	0.0092	0.0092	0.0092	0.046	0.046	142.14	0.00092	0.00092	0.00966	0.002116	0.000046	0.000046	0.01196	0.0000046	28.612	0.000184	0.00552	
7-Oct-09	21	169.695	--	1.215	55.08	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	46.17	--	--
14-Oct-09	22	73.47	--	0.465	46.035	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	28.3185	--	--
21-Oct-09	23	58.88	--	0.92	48.76	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	24.242	--	--
28-Oct-09	24	47.84	--	1.38	32.2	0.023	0.092	0.023	0.00092	0.0828	0.0092	98.9	0.0092	0.0092	0.0092	0.046	0.046	87.86	0.00138	0.000782	0.01012	0.00069	0.000046	0.000046	0.01104	0.0000046	15.916	0.000092	0.001932	
4-Nov-09	25	54.18	--	0.86	36.55	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	17.372	--	--
11-Nov-09	26	55.055	--	0.455	33.215	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	16.744	--	--
18-Nov-09	27	47.6	--	0.425	32.725	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	16.405	--	--
25-Nov-09	28	63.9	--	0.45	31.5	0.0225	0.09	0.0225	0.0009	0.063	0.009	120.6	0.009	0.009	0.009	0.045	0.045	90.45	0.0018	0.000765	0.0108	0.00081	0.000045	0.000045	0.0063	0.0000045	19.44	0.00009	0.00189	
2-Dec-09	29	53.69	--	0.455	35.945	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	17.29	--	--
9-Dec-09	30	49.755	--	0.465	35.805	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	17.3445	--	--
16-Dec-09	31	53.32	--	0.43	39.56	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	18.662	--	--

Appendix G: Kinetic Data, Humidity Cell Tests

Boston Mixed
HC-16 Tailings

Loading Calculations																														
Date	Accum. Weeks	SO4 mg/kg/wk	Acidity to pH 4.5 mg/kg/wk	Acidity to pH 8.3 mg/kg/wk	Total Alkalinity (mg CaCO3/l)	Fluoride mg/kg/wk	Chloride mg/kg/wk	Nitrate-N mg/kg/wk	Nitrite-N mg/kg/wk	Total Ammonia mg/kg/wk	Diss.-P mg/kg/wk	TDS mg/kg/wk	Total CN mg/kg/wk	WAD CN mg/kg/wk	Free CN mg/kg/wk	SCN mg/kg/wk	CNO mg/kg/wk	Hardness CaCO3 mg/kg/wk	Al mg/kg/wk	Sb mg/kg/wk	As mg/kg/wk	Ba mg/kg/wk	Be mg/kg/wk	Bi mg/kg/wk	B mg/kg/wk	Cd mg/kg/wk	Ca mg/kg/wk	Cr mg/kg/wk	Co mg/kg/wk	
					mg/kg/wk																									
24-Nov-10	80	15.015	--	0.455	41.405	0.00455	0.2275	0.0091	0.002275	0.01911	0.002275	59.15	0.0091	0.0091	0.0091	0.0455	0.0455	59.5428015	0.0015925	0.0005915	0.005278	0.0003458	0.00000455	0.000002275	0.02275	0.000002275	9.1455	0.000137	0.000398	
1-Dec-10	81	13.95	--	0.45	39.6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	8.505	--	--
8-Dec-10	82	14.96	--	0.44	37.84	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	8.624	--	--
15-Dec-10	83	14.4	--	0.45	39.15	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	8.64	--	--
22-Dec-10	84	14.08	--	0.44	39.16	--	0.22	--	--	--	--	--	--	--	--	--	--	--	54.56	0.001364	0.0004884	0.004532	0.0003212	0.0000044	0.0000022	0.022	0.0000022	9.108	0.000044	0.000367
29-Dec-10	85	15.13	--	0.445	40.94	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	9.3005	--	--
5-Jan-11	86	14.52	--	0.44	38.72	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	9.064	--	--
12-Jan-11	87	14.4	--	0.45	36.45	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	8.91	--	--
19-Jan-11	88	15.13	--	0.445	36.49	0.02225	0.2225	0.0089	0.002225	0.016465	0.002225	53.4	0.0089	0.0089	0.0089	0.0445	0.0445	53.845	0.0012905	0.00050285	0.0045835	0.0003471	0.00000445	0.000002225	0.02225	0.000002225	9.256	0.000178	0.000311	
26-Jan-11	89	15.225	--	0.435	38.715	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	9.483	--	--
2-Feb-11	90	16.2	--	0.45	38.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	8.82	--	--
9-Feb-11	91	14.875	--	0.425	34.425	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	8.2875	--	--
16-Feb-11	92	15.18	--	0.46	40.94	--	0.23	--	--	--	--	--	--	--	--	--	--	--	55.2	0.00138	0.0004968	0.0043102	0.0003358	0.0000046	0.0000023	0.023	0.0000023	8.924	0.000046	0.000348
23-Feb-11	93	14.24	--	0.445	39.605	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	9.2115	--	--
2-Mar-11	94	14.55	--	0.485	42.68	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	9.797	--	--
9-Mar-11	95	13.33	--	0.43	32.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.697	--	--
16-Mar-11	96	14.79	--	0.435	33.93	0.02175	0.2175	0.0087	0.002175	0.038715	0.00348	47.85	0.0087	0.0087	0.0087	0.0435	0.0435	48.72	0.0019575	0.00039585	0.003828	0.0004002	0.00000435	0.000002175	0.02175	0.000002175	8.352	4.35E-05	0.000259	
23-Mar-11	97	14.45	--	0.425	33.15	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.48	--	--
30-Mar-11	98	14.24	--	0.445	36.935	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	8.0545	--	--
6-Apr-11	99	15.13	--	0.445	38.715	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	9.0335	--	--
13-Apr-11	100	13.95	--	0.465	40.455	--	0.2325	--	--	--	--	--	--	--	--	--	--	54.405	0.0019995	0.0004278	0.0041757	0.00059055	0.00000465	0.000002325	0.02325	0.000002325	9.393	4.65E-05	0.000283	
20-Apr-11	101	13.23	--	0.98	44.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	10.388	--	--
27-Apr-11	102	12.18	--	0.87	36.105	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	8.526	--	--
4-May-11	103	13.6	--	0.425	35.7	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.99	--	--
11-May-11	104	14.4	--	--	44.16	0.0048	0.24	0.0096	0.0024	0.0768	0.00384	57.6	0.0096	0.0096	0.0096	0.048	0.048	60.96	0.00144	0.0004464	0.0039792	0.0004224	0.0000048	0.0000024	0.024	0.0000024	10.416	0.000048	0.000287	
18-May-11	105	13.28	--	0.415	38.595	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	9.047	--	--
25-May-11	106	13.485	--	0.465	39.06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	9.672	--	--
1-Jun-11	107	12.04	--	0.43	36.12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	8.041	--	--
8-Jun-11	108	13.95	--	0.465	42.315	--	0.2325	--	--	--	--	--	--	--	--	--	--	57.195	0.0023715	0.0004185	0.00372	0.00108345	0.00000465	0.000002325	0.02325	0.000002325	9.486	4.65E-05	0.000261	
15-Jun-11	109	13.76	--	--	39.99	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	8.944	--	--
22-Jun-11	110	10.625	--	--	34.425	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	8.2025	--	--
29-Jun-11	111	14.55	--	--	43.65	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	10.961	--	--
6-Jul-11	112	9.135	--	0.435	30.45	0.00435	0.2175	0.0087	0.002175	0.0957	0.003045	42.63	0.0087	0.0087	0.0087	0.0435	0.0435	39.063	0.00174	0.00026535	0.0031929	0.00035235	0.00000435	0.000002175	0.02175	0.000002175	7.1775	4.35E-05	0.000195	
13-Jul-11	113	11.205	--	0.415	29.05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.553	--	--
20-Jul-11	114	15.84	--	0.44	36.52	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	8.976	--	--
27-Jul-11	115	16.8	--	--	46.08	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	11.376	--	--
3-Aug-11	116	10.12	--	0.44	36.96	--	0.396	--	--	--	--	--	--	--	--	--														

Appendix G: Kinetic Data, Humidity Cell Tests

Boston Mixed
HC-16 Tailings

Loading Calculations																										
Date	Accum. Weeks	Cu mg/kg/wk	Fe mg/kg/wk	Pb mg/kg/wk	Li mg/kg/wk	Mg mg/kg/wk	Mn mg/kg/wk	Hg (CVAF) mg/kg/wk	Mo mg/kg/wk	Ni mg/kg/wk	P mg/kg/wk	K mg/kg/wk	Se mg/kg/wk	Si mg/kg/wk	Ag mg/kg/wk	Na mg/kg/wk	Sr mg/kg/wk	Te mg/kg/wk	Tl mg/kg/wk	Th mg/kg/wk	Sn mg/kg/wk	Ti mg/kg/wk	U mg/kg/wk	V mg/kg/wk	Zn mg/kg/wk	Zr mg/kg/wk
13-May-09	0	0.00744	0.0434	0.000124	0.003348	35.092	0.0961	1.3E-05	0.0744	0.0868	0.0186	2.8644	0.006076	0.6882	0.000136	8.432	0.18042	0.000124	1.24E-05	0.000062	0.000186	0.000124	0.000062	0.000124	0.00248	0.00124
20-May-09	1	0.001456	0.01365	0.000091	0.001183	12.8765	0.058695	9.1E-06	0.01456	0.06825	0.01365	1.001	0.001365	0.3367	2.28E-05	1.2649	0.050505	0.000091	9.1E-06	4.55E-05	0.000091	0.000091	4.55E-05	0.000091	0.00091	0.00091
27-May-09	2	0.001125	0.009	0.00009	0.0009	10.755	0.0972	0.000009	0.00585	0.0864	0.0135	0.7515	0.0009	0.225	2.25E-05	0.5805	0.04815	0.00009	0.000009	0.000045	0.00009	0.00009	0.000045	0.00009	0.0009	0.0009
3-Jun-09	3	--	0.0046	--	--	14.766	--	--	--	--	--	0.598	--	--	--	0.506	--	--	--	--	--	--	--	--	--	--
10-Jun-09	4	0.000855	0.00475	0.000095	0.001663	33.4875	0.296875	9.5E-06	0.003705	0.2603	0.01425	1.04025	0.003278	0.31825	2.38E-05	0.608	0.127775	0.000095	9.5E-06	4.75E-05	0.000095	0.000095	4.75E-05	0.000095	0.00095	0.00095
17-Jun-09	5	--	0.0043	--	--	19.436	--	--	--	--	--	0.602	--	--	--	0.387	--	--	--	--	--	--	--	--	--	--
24-Jun-09	6	--	0.00455	--	--	22.75	--	--	--	--	--	0.5915	--	--	--	0.3185	--	--	--	--	--	--	--	--	--	--
1-Jul-09	7	--	0.005	--	--	21.1	--	--	--	--	--	0.55	--	--	--	0.4	--	--	--	--	--	--	--	--	--	--
8-Jul-09	8	0.000546	0.0042	0.000084	0.001134	27.888	0.16128	8.4E-06	0.001764	0.0987	0.0126	0.7476	0.001176	0.2058	0.000021	0.3234	0.07854	0.000084	8.4E-06	0.000042	0.000084	0.000084	0.000042	0.000084	0.00084	0.00084
15-Jul-09	9	--	0.0049	--	--	26.068	--	--	--	--	--	0.833	--	--	--	0.392	--	--	--	--	--	--	--	--	--	--
22-Jul-09	10	--	0.0048	--	--	16.944	--	--	--	--	--	0.624	--	--	--	0.288	--	--	--	--	--	--	--	--	--	--
29-Jul-09	11	--	0.0046	--	--	9.66	--	--	--	--	--	0.368	--	--	--	0.138	--	--	--	--	--	--	--	--	--	--
5-Aug-09	12	0.0006825	0.00455	0.000091	0.001229	43.771	0.11102	9.1E-06	0.003276	0.061425	0.0546	0.9191	0.003959	0.26845	2.28E-05	0.4095	0.09919	0.000091	9.1E-06	4.55E-05	0.000091	0.000091	4.55E-05	0.000091	0.000455	0.00091
12-Aug-09	13	--	0.00465	--	--	15.9495	--	--	--	--	--	0.5115	--	--	--	0.0465	--	--	--	--	--	--	--	--	--	--
19-Aug-09	14	--	0.0043	--	--	42.871	--	--	--	--	--	0.645	--	--	--	0.301	--	--	--	--	--	--	--	--	--	--
26-Aug-09	15	--	0.0047	--	--	19.928	--	--	--	--	--	0.517	--	--	--	0.188	--	--	--	--	--	--	--	--	--	--
2-Sep-09	16	0.000546	0.00455	0.000091	0.000819	21.294	0.072345	9.1E-06	0.001547	0.036855	0.01365	0.46865	0.000728	0.25935	2.28E-05	0.17745	0.038675	0.000091	9.1E-06	4.55E-05	0.000091	0.000091	4.55E-05	0.000091	0.001365	0.00091
9-Sep-09	17	--	0.0044	--	--	10.736	--	--	--	--	--	0.308	--	--	--	0.132	--	--	--	--	--	--	--	--	--	--
16-Sep-09	18	--	0.00435	--	--	15.225	--	--	--	--	--	0.348	--	--	--	0.087	--	--	--	--	--	--	--	--	--	--
23-Sep-09	19	--	0.00445	--	--	24.7865	--	--	--	--	--	0.4005	--	--	--	0.178	--	--	--	--	--	--	--	--	--	--
30-Sep-09	20	0.00046	0.0046	0.000023	0.00092	17.112	0.03496	9.2E-06	0.002024	0.02116	0.0069	0.3772	0.000736	0.2576	1.84E-05	0.1702	0.0299	0.000092	9.2E-06	0.000023	0.000046	0.000138	0.000023	0.000046	0.00046	0.000046
7-Oct-09	21	--	0.00405	--	--	26.973	--	--	--	--	--	0.405	--	--	--	0.162	--	--	--	--	--	--	--	--	--	--
14-Oct-09	22	--	0.00465	--	--	16.1355	--	--	--	--	--	0.279	--	--	--	0.093	--	--	--	--	--	--	--	--	--	--
21-Oct-09	23	--	0.0046	--	--	13.8	--	--	--	--	--	0.322	--	--	--	0.138	--	--	--	--	--	--	--	--	--	--
28-Oct-09	24	0.001242	0.0046	0.000023	0.000782	11.638	0.01426	9.2E-06	0.002116	0.0069	0.0069	0.2668	0.000552	0.1932	1.84E-05	0.1104	0.0161	0.000092	9.2E-06	0.000023	0.000046	0.000092	0.000023	0.000046	0.00092	0.000046
4-Nov-09	25	--	0.0043	--	--	11.223	--	--	--	--	--	0.215	--	--	--	0.086	--	--	--	--	--	--	--	--	--	--
11-Nov-09	26	--	0.00455	--	--	11.466	--	--	--	--	--	0.2275	--	--	--	0.091	--	--	--	--	--	--	--	--	--	--
18-Nov-09	27	--	0.00425	--	--	11.0075	--	--	--	--	--	0.17	--	--	--	0.085	--	--	--	--	--	--	--	--	--	--
25-Nov-09	28	0.001125	0.0045	2.25E-05	0.00027	10.125	0.00945	0.000009	0.00207	0.00675	0.00675	0.2295	0.001035	0.144	0.000018	0.0765	0.0171	0.00009	0.000009	4.95E-05	0.000045	0.00009	2.25E-05	0.000045	0.00045	0.000045
2-Dec-09	29	--	0.00455	--	--	12.1485	--	--	--	--	--	0.182	--	--	--	0.091	--	--	--	--	--	--	--	--	--	--
9-Dec-09	30	--	0.00465	--	--	12.6945	--	--	--	--	--	0.186	--	--	--	0.093	--	--	--	--	--	--	--	--	--	--
16-Dec-09	31	--	0.0043	--	--	13.846	--	--	--	--	--	0.215	--	--	--	0.086	--	--	--	--	--	--	--	--	--	--
23-Dec-09	32	0.000336	0.0042	0.000021	0.000672	13.398	0.0126	8.4E-06	0.00189	0.00798	0.0168	0.2352	0.001302	0.2142	1.68E-05	0.0966	0.01722	0.000084	8.4E-06	0.000021	0.000042	0.000084	0.000021	0.000042	0.00042	0.000042
30-Dec-09	33	--	0.00435	--	--	14.79	--	--	--	--	--	0.174	--	--	--	0.087	--	--	--	--	--	--	--	--	--	--
6-Jan-10	34	--	0.0047	--	--	14.335	--	--	--	--	--	0.188	--	--	--	0.094	--	--	--	--	--	--	--	--	--	--
13-Jan-10	35	--	0.0046	--	--	8.648	--	--	--	--	--	0.138	--	--	--	0.092	--	--	--	--	--	--	--	--	--	--
20-Jan-10	36	0.000348	0.00435	2.18E-05	0.000348	7.569	0.00522	8.7E-06	0.001914	0.002871	0.006525	0.1479	0.00074	0.14355	1.74E-05	0.05655	0.0087	0.000087	8.7E-06	2.18E-05	4.35E-05	0.000087	2.18E-05	4.35E-05	0.000435	4.35E-05
27-Jan-10	37	--	0.00435	--	--	10.701	--	--	--	--	--	0.1305	--	--	--	0.087	--	--	--	--	--	--	--	--	--	--
3-Feb-10	38	--	0.00425	--	--	10.625	--	--	--	--	--	0.17	--	--	--	0.085	--	--	--	--	--	--	--	--	--	--
10-Feb-10	39	--	0.0046	--	--	11.684	--	--	--	--	--	0.184	--	--	--	0.1978	--	--	--	--	--	--	--			

Appendix G: Kinetic Data, Humidity Cell Tests

Boston Mixed
HC-16 Tailings

Loading Calculations																											
Date	Accum. Weeks	Cu mg/kg/wk	Fe mg/kg/wk	Pb mg/kg/wk	Li mg/kg/wk	Mg mg/kg/wk	Mn mg/kg/wk	Hg (CVAF) mg/kg/wk	Mo mg/kg/wk	Ni mg/kg/wk	P mg/kg/wk	K mg/kg/wk	Se mg/kg/wk	Si mg/kg/wk	Ag mg/kg/wk	Na mg/kg/wk	Sr mg/kg/wk	Te mg/kg/wk	Tl mg/kg/wk	Th mg/kg/wk	Sn mg/kg/wk	Ti mg/kg/wk	U mg/kg/wk	V mg/kg/wk	Zn mg/kg/wk	Zr mg/kg/wk	
24-Nov-10	80	0.00025935	0.001365	1.27E-05	0.000273	8.918	0.006871	3.64E-06	0.000965	0.00131	0.00091	0.1092	0.000651	0.182	2.28E-06	0.04095	0.008372	9.1E-06	3.64E-06	2.28E-06	1.37E-05	0.000319	4.1E-06	0.000091	0.000091	4.55E-05	
1-Dec-10	81	--	0.0045	--	--	7.695	--	--	--	--	--	0.135	--	--	--	0.045	--	--	--	--	--	--	--	--	--	--	
8-Dec-10	82	--	0.0044	--	--	7.92	--	--	--	--	--	0.132	--	--	--	0.088	--	--	--	--	--	--	--	--	--	--	
15-Dec-10	83	--	0.0045	--	--	7.74	--	--	--	--	--	0.135	--	--	--	0.045	--	--	--	--	--	--	--	--	--	--	
22-Dec-10	84	0.0001496	0.0022	3.08E-06	0.000264	7.788	0.007084	8.8E-07	0.000761	0.00125	0.00132	0.0924	0.00055	0.176	2.2E-06	0.0308	0.007568	8.8E-06	3.08E-06	2.2E-06	8.8E-06	0.00022	5.28E-06	0.000088	0.000088	0.000044	
29-Dec-10	85	--	0.00445	--	--	8.4995	--	--	--	--	--	0.1335	--	--	--	0.0445	--	--	--	--	--	--	--	--	--	--	
5-Jan-11	86	--	0.0044	--	--	8.052	--	--	--	--	--	0.132	--	--	--	0.044	--	--	--	--	--	--	--	--	--	--	
12-Jan-11	87	--	0.0045	--	--	7.83	--	--	--	--	--	0.135	--	--	--	0.045	--	--	--	--	--	--	--	--	--	--	
19-Jan-11	88	0.00041385	0.00089	8.01E-06	0.000223	7.476	0.00672	8.9E-07	0.00081	0.001059	0.00089	0.089	0.000525	0.178	2.23E-06	0.03115	0.007921	8.9E-06	2.67E-06	2.23E-06	2.23E-05	0.000223	3.12E-06	0.000089	0.000712	4.45E-05	
26-Jan-11	89	--	0.00435	--	--	8.526	--	--	--	--	--	0.2175	--	--	--	0.0435	--	--	--	--	--	--	--	--	--	--	
2-Feb-11	90	--	0.0045	--	--	7.83	--	--	--	--	--	0.45	--	--	--	0.315	--	--	--	--	--	--	--	--	--	--	
9-Feb-11	91	--	0.00425	--	--	7.225	--	--	--	--	--	0.1275	--	--	--	0.0425	--	--	--	--	--	--	--	--	--	--	
16-Feb-11	92	0.0003496	0.00138	5.52E-06	0.00023	8.004	0.00782	9.2E-07	0.000695	0.00127	0.00092	0.092	0.000616	0.184	2.3E-06	0.0322	0.008602	9.2E-06	3.22E-06	2.3E-06	1.38E-05	0.00023	5.06E-06	0.000092	0.000046	0.000046	
23-Feb-11	93	--	0.00445	--	--	8.099	--	--	--	--	--	0.1335	--	--	--	0.0445	--	--	--	--	--	--	--	--	--	--	
2-Mar-11	94	--	0.00485	--	--	8.342	--	--	--	--	--	0.1455	--	--	--	0.0485	--	--	--	--	--	--	--	--	--	--	
9-Mar-11	95	--	0.0043	--	--	6.536	--	--	--	--	--	0.129	--	--	--	0.043	--	--	--	--	--	--	--	--	--	--	
16-Mar-11	96	0.00010875	0.00087	3.48E-06	0.000218	6.786	0.005394	8.7E-07	0.000626	0.000857	0.00174	0.0783	0.000409	0.174	2.18E-06	0.03045	0.007265	8.7E-06	3.05E-06	2.18E-06	8.7E-06	0.000218	2.18E-06	0.000087	4.35E-05	4.35E-05	
23-Mar-11	97	--	0.00425	--	--	6.46	--	--	--	--	--	0.1275	--	--	--	0.0425	--	--	--	--	--	--	--	--	--	--	
30-Mar-11	98	--	0.00445	--	--	7.298	--	--	--	--	--	0.1335	--	--	--	0.0445	--	--	--	--	--	--	--	--	--	--	
6-Apr-11	99	--	0.00445	--	--	8.01	--	--	--	--	--	0.1335	--	--	--	0.0445	--	--	--	--	--	--	--	--	--	--	
13-Apr-11	100	0.00012555	0.00093	3.26E-06	0.000233	7.5795	0.006557	9.3E-07	0.000651	0.000953	0.00558	0.08835	0.000381	0.186	2.33E-06	0.03255	0.012276	9.3E-06	2.33E-06	2.33E-06	1.86E-05	0.000233	4.19E-06	0.000093	0.000093	4.65E-05	
20-Apr-11	101	--	0.0049	--	--	8.967	--	--	--	--	--	0.245	--	--	--	0.049	--	--	--	--	--	--	--	--	--	--	
27-Apr-11	102	--	0.00435	--	--	7.308	--	--	--	--	--	0.1305	--	--	--	0.0435	--	--	--	--	--	--	--	--	--	--	
4-May-11	103	--	0.00425	--	--	6.715	--	--	--	--	--	0.1275	--	--	--	0.17	--	--	--	--	--	--	--	--	--	--	
11-May-11	104	0.0001584	0.00048	4.8E-06	0.000288	8.496	0.0072	9.6E-07	0.000682	0.001027	0.0048	0.0912	0.000336	0.24	2.4E-06	0.0432	0.008832	9.6E-06	3.84E-06	2.4E-06	0.000024	0.00024	6.72E-06	0.000096	0.000288	0.000048	
18-May-11	105	--	0.00415	--	--	8.051	--	--	--	--	--	0.1245	--	--	--	0.0415	--	--	--	--	--	--	--	--	--	--	
25-May-11	106	--	0.00465	--	--	8.2305	--	--	--	--	--	0.1395	--	--	--	0.0465	--	--	--	--	--	--	--	--	--	--	
1-Jun-11	107	--	0.0043	--	--	7.095	--	--	--	--	--	1.591	--	--	--	0.172	--	--	--	--	--	--	--	--	--	--	
8-Jun-11	108	0.0002046	0.000465	4.19E-06	0.000233	8.184	0.006185	9.3E-07	0.000688	0.000949	0.00465	0.07905	0.000349	0.2325	2.33E-06	0.0372	0.013392	9.3E-06	3.26E-06	2.33E-06	2.33E-05	0.000233	5.12E-06	0.000093	0.002232	4.65E-05	
15-Jun-11	109	--	0.0043	--	--	7.697	--	--	--	--	--	0.129	--	--	--	0.043	--	--	--	--	--	--	--	--	--	--	
22-Jun-11	110	--	0.00425	--	--	6.6725	--	--	--	--	--	0.17	--	--	--	0.0425	--	--	--	--	--	--	--	--	--	--	
29-Jun-11	111	--	0.00485	--	--	9.312	--	--	--	--	--	0.1455	--	--	--	0.0485	--	--	--	--	--	--	--	--	--	--	
6-Jul-11	112	0.0001218	0.00087	4.79E-06	0.000218	5.133	0.005351	8.7E-07	0.000418	0.0006	0.003045	0.0609	0.000218	0.174	2.18E-06	0.0348	0.006003	8.7E-06	2.18E-06	2.18E-06	1.74E-05	0.000218	2.18E-06	0.000087	0.000392	4.35E-05	
13-Jul-11	113	--	0.00415	--	--	6.0175	--	--	--	--	--	0.1245	--	--	--	0.0415	--	--	--	--	--	--	--	--	--	--	
20-Jul-11	114	--	0.0044	--	--	7.832	--	--	--	--	--	0.132	--	--	--	0.044	--	--	--	--	--	--	--	--	--	--	
27-Jul-11	115	--	0.0048	--	--	10.032	--	--	--	--	--	0.144	--	--	--	0.096	--	--	--	--	--	--	--	--	--	--	
3-Aug-11	116	0.0001188	0.00088	9.68E-06	0.00022	6.952	0.004664	8.8E-07	0.000554	0.000735	0.00748	0.0748	0.000352	0.22	2.2E-06	0.0396	0.007348	8.8E-06	2.2E-06	2.2E-06	1.76E-05	0.00022	3.52E-06	0.000088	0.00044	0.000044	
10-Aug-11	117	--	0.00465	--	--	7.0215	--	--	--	--	--	0.1395	--	--	--	0.093	--	--	--	--	--	--	--	--	--	--	
17-Aug-11	118	--	0.0045	--	--	5.985	--	--	--	--	--	0.135	--	--	--	0.045	--	--	--	--	--	--	--	--	--	--	
24-Aug-11	119	--	0.0044	--	--	5.236	--	--	--	--	--	0.132	--	--	--	0.132	--	--	--	--	--	--	--	--	--	--	
31-Aug-11	120	0.0001056	0.00096	7.2E-06	0.00024	6.24	0.005568	9.6E-07	0.000451	0.000706	0.00384	0.0576	0.000283	0.192	2.4E-06	0.0384	0.007056	9.6E-06	2.4E-06	2.4E-06	9.6E-06	0.00024	2.88E-06	0.000096	0.000384	0.000048	
7-Sep-11	121	--	0.00445	--	--	8.0545	--	--	--	--	--	0.1335	--	--	--	0.0445	--	--	--	--	--	--	--	--	--	--	
14-Sep-11	122	--	0.00445	--	--	7.3425	--	--	--	--	--	0.178	--	--	--	0.0445	--	--	--	--	--	--	--	--	--	--	
21-Sep-11	123	--	0.0046	--	--	7.498	--	--	--	--	--	0.138	--	--	--</												

Appendix H – Figures, Humidity Cell Tests

Hope Bay Humidity Cells

