

Mount Nansen Humidity Cell Testwork Update



FINAL



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Prepared for:
Assessment and Abandoned Mines,
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Prepared by:
Lorax Environmental Services Ltd.
2289 Burrard St.
Vancouver, BC, V6J 3H9

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1. Introduction

1. Introduction

The initial 93 cycles of leachate data from humidity cell testing of Mount Nansen tailings material has been previously summarized and discussed (Lorax, 2011, Appendix B- section 5.4). However, additional testing was completed through 97 test cycles and the T1-T3 humidity cell residues were analyzed for Acid Base Accounting (ABA, Appendix A) following completion of the lab-based kinetic experiments (Appendix B). This report is intended to provide an updated summary of the humidity cell test results for Mount Nansen and discuss the Acid Rock Drainage/Metal Leaching (ARD/ML) potential of this material including the final 4 cycles of data.

2. Sample Description and Methods

2. Sample Description and Methods

Detailed sample selection methodology and sample descriptions are included in Appendix B of Lorax, 2011 and summarized here. Six humidity cells were initiated for Mount Nansen tailings in July/August of 2009 (Table 2-1). Split samples of humidity cells T1, T2 and T3 were each subjected to a sulfuric acid leach before commencing the laboratory experiments with the objective of removing carbonate minerals, and thereby CaNP, as well as secondary sulfate products. The pre-leached samples are named T4, T5, and T6 (Table 2-1). The purposes behind removing Carbonate Neutralizing Potential (CaNP) and secondary sulfate products are threefold:

1. The removal of CaNP promotes the development of acidic conditions and provides the opportunity to observe the leaching behaviour under decreased pH conditions;
2. Removal of CaNP provides an opportunity to assess the ability of non-carbonate minerals to neutralize acidity generated from sulfide oxidation; and
3. The removal of secondary sulfates (*i.e.* gypsum and Cu-sulfate added during ore processing) allows the evaluation of the primary sulfide mineral reaction rates.

**Table 2-1:
Details of the Mount Nansen Humidity Cell Test**

HC	Sample ID	Start-up Date	End Date	No. Cycles	Dry Wt. of Sample (kg)	Volume of Initial Flushings (mL)	Flushing Rate / Weekly Input (mL)	Temp (°C)
T1	tailings clay composite sample	28-Jul-09	7-Jun-11	97	1.0	750	500	20-22
T2	tailings sand silt composite sample	28-Jul-09	7-Jun-11	97	1.0	750	500	20-22
T3	tailings silt clay composite sample	28-Jul-09	7-Jun-11	97	1.0	750	500	20-22
T4	carbonate depleted sub-sample of T1	11-Aug-09	8-Sep-10	59	1.0	750	500	20-22
T5	carbonate depleted sub-sample of T2	11-Aug-09	8-Sep-10	59	1.0	750	500	20-22
T6	carbonate depleted sub-sample of T3	11-Aug-09	8-Sep-10	59	1.0	750	500	20-22

3. ABA Results from Tailings and Humidity Cell Residues

3. ABA Results from Tailings and Humidity Cell Residues

ABA results for Mount Nansen tailings (T1, T2 and T3) were obtained prior to start-up and following completion of the lab-based kinetic experiments to assess leaching behavior, a summary of the results are shown in Table 3-1. The full dataset is included in Appendix A-1. The ABA results for T4, T5, and T6 prior to start-up are the same as T1, T2, and T3, respectively, as these are splits of each other. The T4-T6 residues were not analyzed for ABA following completion of the lab-based kinetic experiment because at the time of termination it was not deemed necessary.

The paste pH remains neutral (7.6-8.1) in T1-T3 following the completion of the lab-based kinetic experiment and therefore were non-acid generating even in the final weeks of the lab-based kinetic experiment. Total sulfur (*i.e.*, sulfate and non-sulfate sulfur) was leached from tailings samples over the course of the experiment to variable degrees (10-39%) with sulfate-sulfur accounting for a larger proportion of the total-sulfur depletion, compared to non-sulfate-sulfur. A significant amount of sulfate-sulfur remained in the tailings mass following the completion of the experiment suggesting that a portion of the sulfate concentrations observed in humidity cell leachate, even at the end of the experiment, are derived from the dissolution of sulfates rather than being solely derived from sulfide oxidation. The fact that part of the sulfate observed in leachate was derived from sulfates has implications in the calculations of timing to onset of acid rock drainage as discussed in section 4.2.3.

Approximately 60% of Ca and 20% of Mg were removed from the tailings in cells T1-T3. While dissolved Mg is assumed to be largely derived from dolomite, dissolved Ca may be leached from dolomite, calcite, gypsum and other, less common Ca-bearing minerals. Carbonate-NP was depleted by 31-38% over the 97 weeks of lab-based kinetic testing; therefore a significant amount of NP remained at the end of the experiment. A relatively small amount of non-sulfate sulfur (interpreted to be mostly sulfide) was depleted over the 97 weeks of lab-based kinetic testing (1-18%).

Table 3-1:
Comparison of Static Test Results for Mount Nansen Tailings Humidity Cell
Samples Before and After Lab-Based Kinetic Experiments

Parameter	Unit	Before Kinetic Testing			After Kinetic Testing			Percentage Lost		
		T1	T2	T3	T1	T2	T3	T1	T2	T3
Paste	pH	7.97	7.51	8.06	8.05	7.62	7.90	-	-	-
Total S	%	2.28	4.85	2.22	1.40	4.38	1.64	39%	10%	26%
Sulfate S	%	1.22	0.72	0.74	0.53	0.29	0.31	57%	60%	58%
Non-Sulfate S	%	1.06	4.13	1.48	0.87	4.09	1.33	18%	1%	10%
CaNP	kgCaCO ₃ /t	36.67	30.00	28.33	25.00	20.83	17.50	32%	31%	38%
Ca	%	1.65	1.17	1.39	0.73	0.44	0.52	56%	62%	63%
Mg	%	0.29	0.22	0.21	0.24	0.17	0.17	17%	23%	19%

4. Humidity Cell Leachate Results

4. Humidity Cell Leachate Results

4.1 pH and Alkalinity

Weekly pH values provide insight to the state of competition between acid generating and acid neutralizing reactions in a humidity cell sample. Temporal trends for pH and alkalinity for the Mount Nansen humidity cells are provided in Figure 4-1 and Appendix A-2. The pH values for samples T1, T2 and T3 remained between 7.2 and 8.0 for the extent of the humidity cell experiments, indicating Neutralizing Potential (NP) is derived from a reactive carbonate source and acid consuming reactions predominate. A rapid decrease in pH from greater than 7 to approximately 2 was observed in leachate from humidity cell samples T4, T5 and T6. The low pH values for T4, T5 and T6 is consistent with a lack of alkalinity, reflecting the removal of carbonate and lack of carbonate buffering in these samples (Figure 4-1).

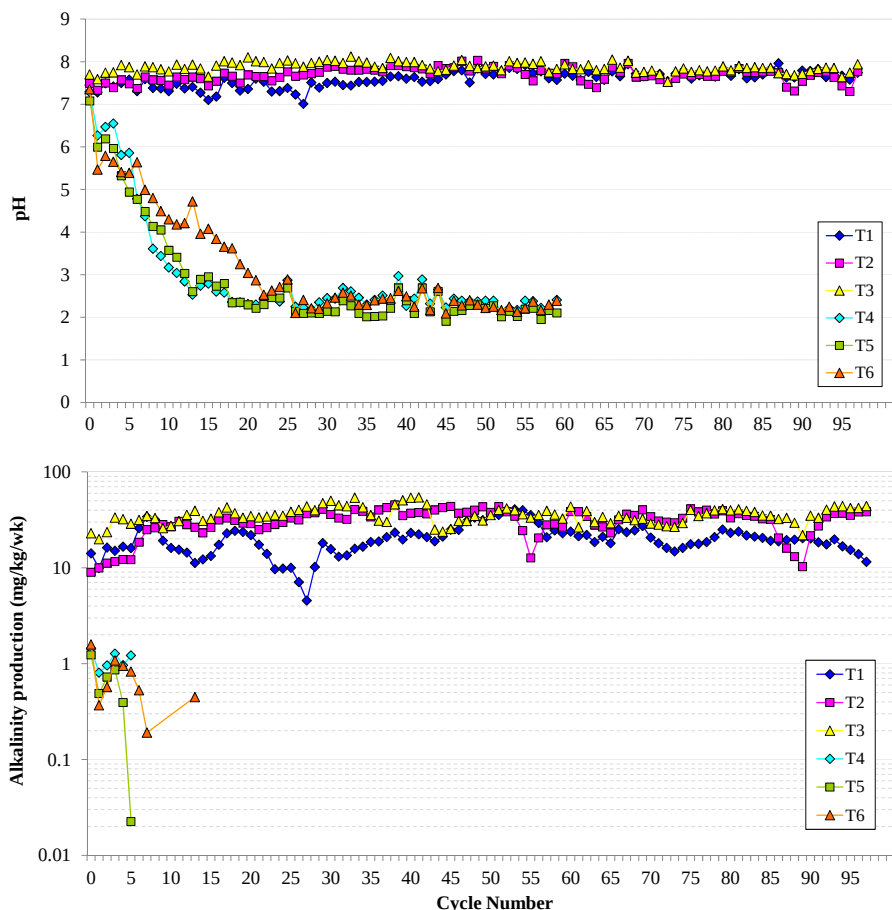


Figure 4-1: pH and Alkalinity Production in Tailings Humidity Cell Leachate (due to high acidity and alkalinity values below the detection limit in T4-T6 analysis of alkalinity in these cells was discontinued after cycle 5 in T4 and T5 and cycle 15 in T6)

4.2 Sulfate Production and Neutralization Potential Depletion

The rates of sulfide oxidation and NP consumption are important parameters derived from the analysis of humidity cell leachate as they provide an indication of the timing to onset of ARD under the conditions of the laboratory kinetic tests. Sulfide oxidation is typically the major source of acid generation in tailings material. NP consumption (loss) in tailings material is most often the result of neutralizing acidity produced during sulfide oxidation. A detailed description of these processes is included in section 5.4.1.2, Appendix B of Lorax (2011).

4.2.1 Sulfide Oxidation Rates – Sulfate Production

The weekly sulfate production and cumulative sulfate load in leachate from the Mount Nansen tailings humidity cells are illustrated in Figure 4-2. Sulfate concentrations in leachate from humidity cells T4, T5 and T6 are initially low, reflecting the removal of soluble secondary sulfate minerals during pre-treatment of the samples. Over the first 20 weeks of the experiment, sulfate production for tests T4, T5 and T6 increase by two orders of magnitude. The increase in sulfate production is consistent with decreasing pH and reflects the dissolution of primary sulfide minerals in the samples. Sample T5 (*i.e.*, sandy-silt tailings) in particular is leaching sulfate at concentrations (1000-1600 mg/kg/wk) higher than T4 (125-185 mg/kg/wk) and T6 (~450 mg/kg/wk).

Concentrations of sulfate in leachate from T1, T2 and T3 are initially high (>500 mg/kg/wk), likely reflective of the dissolution of soluble sulfates. After cycle 16, concentrations of sulfate in leachate from T1, T2 and T3 begin to decrease. Sulfate concentrations in leachate from T2 and T3 remains < 120 mg/kg/wk for the rest of the test period. Sulfate concentrations in leachate from T1 (clay tailings) fluctuates between 120 and 500 mg/kg/wk until cycle 53 when concentrations gradually decrease to < 10 mg/kg/wk. Sulfate production rates in T1 likely differ from T2 and T3 because the clay substrate is more difficult to flush (low hydraulic conductivity) and because the initial sulfate-sulfur concentrations were higher compared to T2 and T3 (Table 3-1).

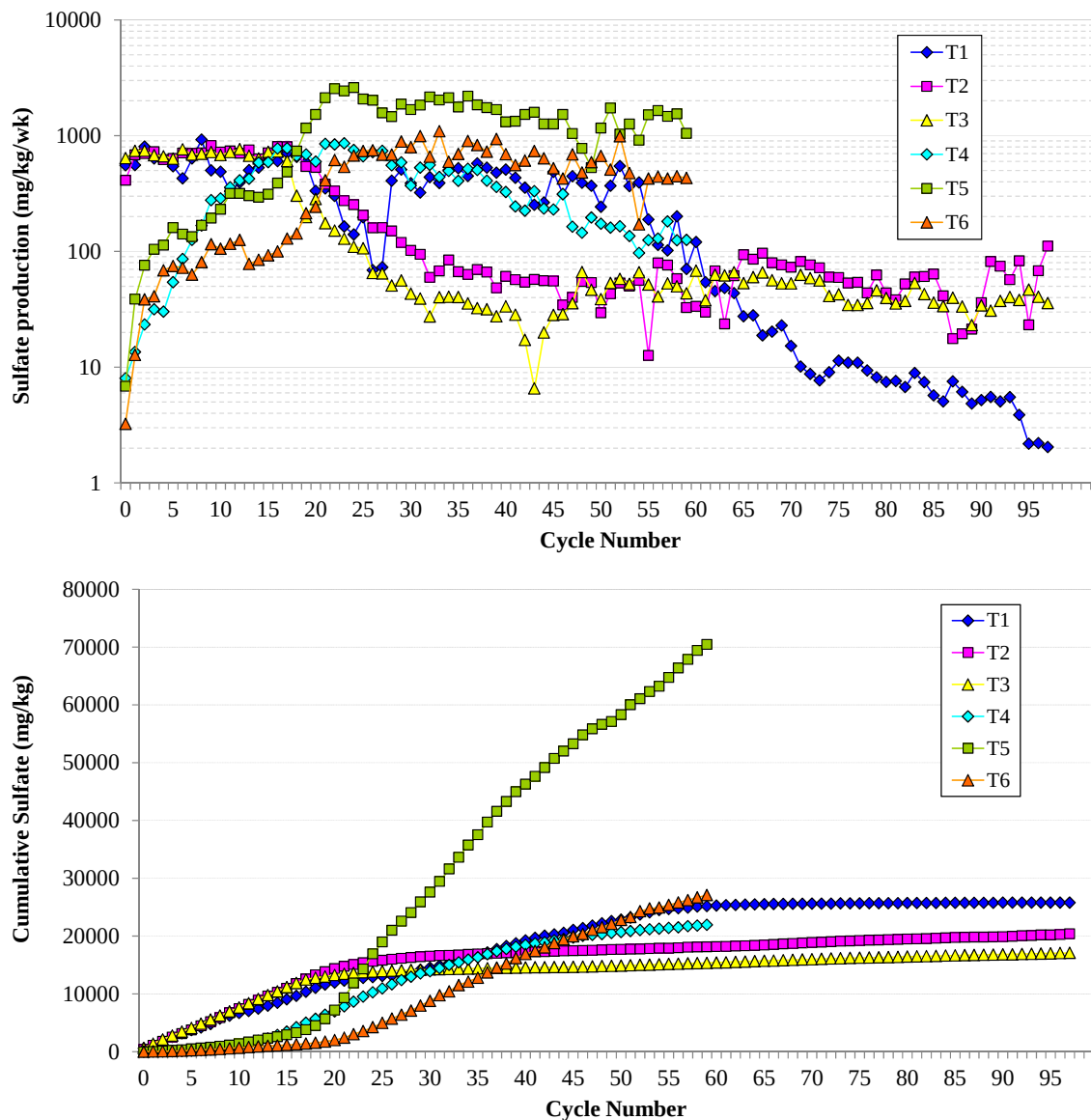


Figure 4-2: Weekly Sulfate Production and Cumulative Sulfate Loading from Tailings Humidity Cells

One way to assess whether the sulfate production from humidity cells is the result of sulfide oxidation is to assess the Fe:S ratios in leachate samples. The stoichiometric ratio of Fe:S in pyrite and arsenopyrite is 1:2 and 1:1, respectively. Therefore, when the Fe:S ratio in acidic leachate is equal to 0.5 then pyrite oxidation is typically the dominant reaction contributing dissolved Fe and S to porewater (Sapsford *et al.*, 2009). Figure 4-3 presents Fe:S molar ratios in leachate from the tailings humidity cell tests. The data in Figure 4-3 indicates that the Fe:S ratios in leachate from the pre-treated cells (T4, T5 and T6) are initially low (< 0.01), suggesting that during early cycles of the experiment sulfate production was likely the result of residual sulfate dissolution in addition to

sulfide oxidation. After cycle 20, the Fe:S ratio begins to approach 0.5, suggesting that sulfide (pyrite) oxidation is the dominant reaction contributing to Fe and S concentrations in solution. The T1-T3 cells cannot be assessed in a similar way because the same line of logic does not apply to pH-neutral cells.

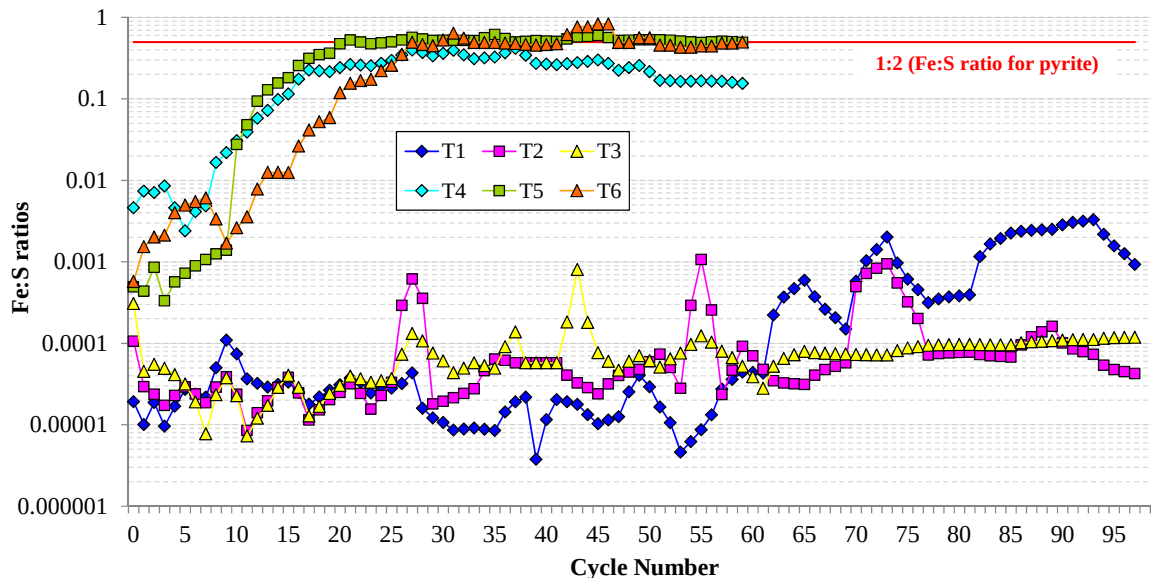


Figure 4-3: Fe:S (umol/kg) Ratios in Leachate from Tailings Humidity Cells (values indicated to be below detection were set at the analytical limit for calculation and plotting purposes)

4.2.2 NP Depletion

The rate of NP consumption (depletion) is calculated from the rate of sulfate production (sulfate concentrations in weekly samples) and release rates of major cations associated with carbonate minerals (Ca, Mg, Sr). The ratio of Ca+Mg+Sr ions relative to sulfate ions is referred to as the Carbonate Molar Ratio (CMR, described in greater detail in section 5.4.1.2, Appendix B, Lorax, 2011). If the entire sulfate load is derived from the oxidation of pyrite and Ca, Mg, and Sr are released only from carbonate minerals during neutralization reactions then a CMR of between 1 and 2 is expected at circum-neutral pH.

The CMR values for each of the six tailings humidity cells are shown in Figure 4-4. The data in Figure 4-4 indicate that CMR values for cells T4, T5 and T6 decrease from 1 to approximately 0.01 during the test, consistent with the removal of available carbonate phases. CMR values for cells T1, T2 and T3 show only a slight increase after the first 25 cycles, most notably in leachate from cell T1. The CMR values in these cells are complicated by the presence of soluble sulfur and therefore cannot be fully substantiated.

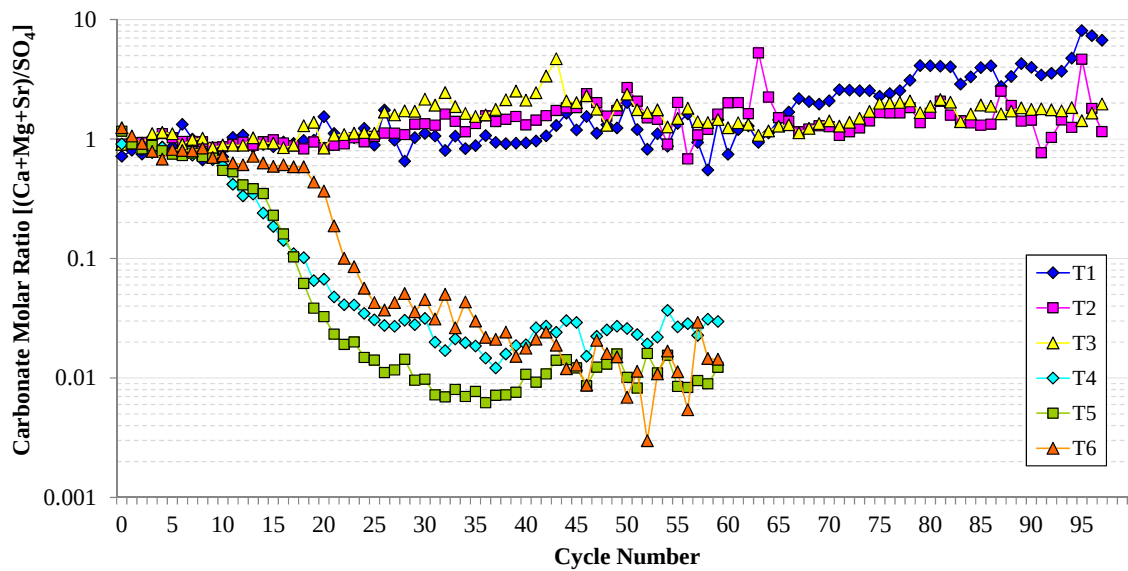


Figure 4-4: Carbonate Molar Ratios for Tailings Humidity Cell Leachate

The release rates for silicon and aluminum for the Mount Nansen tailings humidity cells are presented in Figure 4-5 and included in Appendix A-2. Aluminosilicate minerals have been shown to contribute to the neutralizing capacity of a sample. The elevated Si and Al release rates indicated for the T4, T5 and T6 tailings samples during low pH conditions suggest that the dissolution of silicate phases is not sufficient to neutralize the generated acidity in the Mount Nansen tailings samples following depletion of carbonate phases. However, it is also possible that the sulfuric-acid pre-leach treatment of these cells may have dissolved some of the silicates in addition to the carbonates thereby inhibiting their neutralizing capacity.

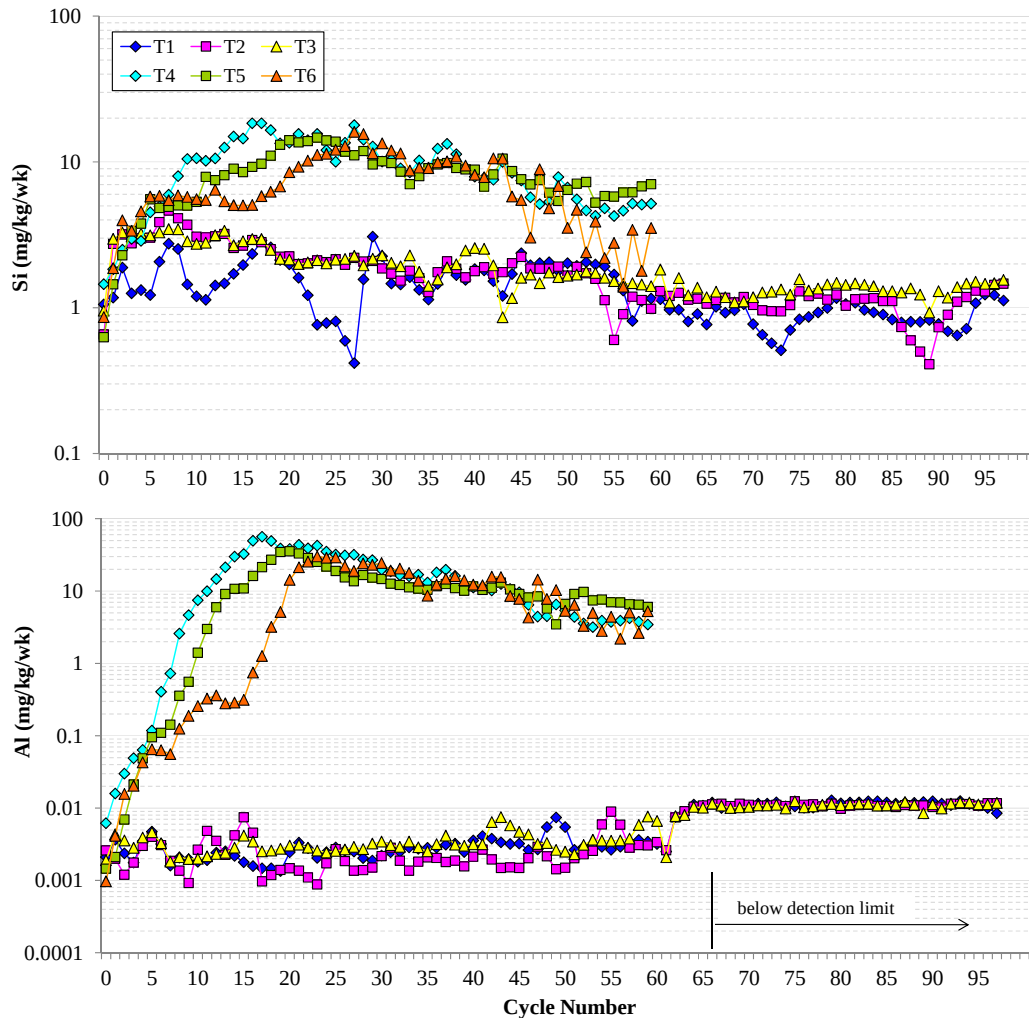


Figure 4-5: Silicon and Aluminum Production in Leachate from Tailings Humidity Cell Tests

4.2.3 Timing to onset of ARD

One of the main goals of lab-based kinetic testing is to determine if a material will eventually generate acidic drainage. This is accomplished by comparing the rate at which sulfide minerals are oxidized, and thus producing acidity, and the rate at which the NP of a material is depleted. For the purposes of obtaining estimates on the timing to the onset of acidic conditions within the three Mount Nansen tailings samples (clay, sand-silt and silt-clay) the following assumptions are made:

1. Acidic drainage will be generated when all CaNP has been depleted from a sample; this tenet is confirmed by the leachate results of the pre-treated T4, T5 and T6 humidity cell test samples;
2. All sulfate measured in humidity cell leachates in the final cycles are derived from sulfide oxidation. In fact, the ABA results following completion of the

experiment (Table 3-1), Fe:S ratios (Figure 4-3), and the CMR values (Figure 4-4), suggest that a portion of the sulfate in the T1-T3 humidity cell leachates is derived from sulfate dissolution;

3. Ca, Mg, and Sr are released only from carbonate minerals during neutralization reactions;
4. The rates of sulfide oxidation and carbonate neutralization measured in the final cycles of the lab-based kinetic experiments will remain unchanged as time progresses;
5. Complete rinsing of mineral oxidation and dissolution products is achieved in the cell;
6. Secondary precipitation and metal attenuation reactions are negligible.

Table 4-1 provides the calculations used to determine the amount of time required to deplete the CaNP present in Mount Nansen tailings humidity cell samples T1, T2 and T3. The data in Table 4-1 indicate that it will take <25 years for all the CaNP to be consumed in the Mount Nansen tailings under the conditions of the experiments. However, it must be understood that comparisons between mineral weathering rates determined in the laboratory and those determined in the field generally reveal large discrepancies, with orders of magnitude lower rates commonly observed in the field (Evans and Banwart, 2006; Evans *et al.*, 2006). Also, a significant amount of conservatism is incorporated into the calculation (*i.e.* all the sulfate measured in leachates is derived from sulfide oxidation). Therefore, the calculated NP depletion times should be interpreted to be lower-bounds.

**Table 4-1:
Calculation of NP Depletion Time for Mount Nansen Tailings Humidity Cells**

Parameter	Units	T1	T2	T3
		Clay Composite <i>cycles 65-97</i>	Sand-Silt Composite <i>cycles 31-97</i>	Silt-Clay Composite <i>cycles 31-97</i>
Total Sulfur ¹	%S	2.28	4.85	2.22
Sulfate Production Rate ²	mg/kg/wk	10.5	57.7	39.4
CMR ³	mol/mol	3.5	1.6	1.9
NP Depletion Rate ⁴	kg CaCO ₃ /t/wk	0.03	0.09	0.07
NP (carbonate) ¹	kg CaCO ₃ /t	36.7	30.0	28.3
NP Depleted ⁵	kg CaCO ₃ /t	2.9	8.6	6.9
NP Remaining ⁶	kg CaCO ₃ /t	33.8	21.4	21.4
Time to Deplete NP	years	23.5	6.4	7.6

Notes: 1. Initial values derived from ABA analysis of solids;
2. Calculated from average of measured cycles 31/65 - 97 (when CMR and sulfate production rates have stabilized);
3. Calculated from average of measured cycles 31/65 - 97 (when CMR and sulfate production rates have stabilized);
4. Calculated as sulfate production rate in mmol/kg * CMR (average of last 5 cycles) / 1000 to convert to kg CaCO₃/t;
5. Calculated as NP Depletion Rate * total number of measured test cycles; and
6. Calculated as Initial NP - NP Depleted after measured test cycles.

4.3 Dissolved Metal Release

Humidity cell leachate concentrations represent primary metal release rates with no consideration given to the influence of field conditions that govern actual metal concentrations in mine drainage. Therefore, concentrations obtained from weekly humidity cell leachate samples do not provide a strictly quantitative estimate of drainage chemistry. Rather, they provide a means to evaluate the leaching behaviour of elements under acidic conditions, which typically exerts a significant control on metal mobility in geologic materials.

Dissolved metal results are given in Appendix A-2. Figure 4-6 presents the average metal release rates calculated for the same cycles used to calculate average sulfate production and NP depletion rates. Metals presented in Figure 4-6 are those which are indicated to exceed the Canadian water quality guidelines for the protection of aquatic life (CCME, 2007) in leachate from the field kinetic tests (Lorax, 2011, Appendix B, Section 5.4.2). To provide a more functional parameter list which can be used to compare results between different humidity cells as well as inter-cycle comparison within a single humidity cell, metal concentrations in mine rock humidity cell leachate is normalized to the mass of sample in the cell and the volume of leachate collected each week, producing weekly mass loadings (mg solute/kg sample/wk).

Figures 4-7 through 4-16 present the weekly loads for dissolved Ag, As, Cd, Cu, Fe, Ni, Mn, Pb, Sb and Zn in Mount Nansen tailings humidity cell leachate. Concentrations of As, Cd, Cu, Fe, Ni, Pb and Zn in leachate from T4, T5 and T6 are up to three orders of magnitude higher than their non-treated counterparts (T1, T2 and T3) and follow a similar trend whereby concentrations increase during the first 20 – 25 cycles and then begin to slowly decrease until the end of the experiments. Concentrations of As (< 100 mg/kg/wk), Cu (< 10 mg/kg/wk), Fe (< 1000 mg/kg/wk) and Zn (< 100 mg/kg/wk), in particular, are elevated in leachate from T4, T5 and T6. Concentrations of As, Cd, Cu, Fe, Mn, Ni, Pb and Zn in leachate from T1, T2 and T3 are low (generally < 0.1 mg/L) and remain relatively constant or decrease over the extent of the experiment.

The increasing metal loads in T4, T5 and T6 is consistent with decreasing pH concentrations in leachate for these cells (Figure 4-1). The greatest metal loads are observed in leachate from humidity cell T5 (pre-leached sandy-silt tailings), which is consistent with higher solid-phase total and non-sulfate-sulfur concentrations (Table 3-1) and sulfate production rates (Figure 4-2) observed for this sample.

Concentrations of Sb in leachate from the tailings humidity cells show a different trend, with the highest concentrations indicated for the untreated tailings samples, particularly,

T2 and T3. Dissolved Sb in leachate from the other tailings cells remain relatively low (< 0.1 mg/L), particularly for cell T4 (consistent with lower leached concentrations from its untreated counterpart, T1).

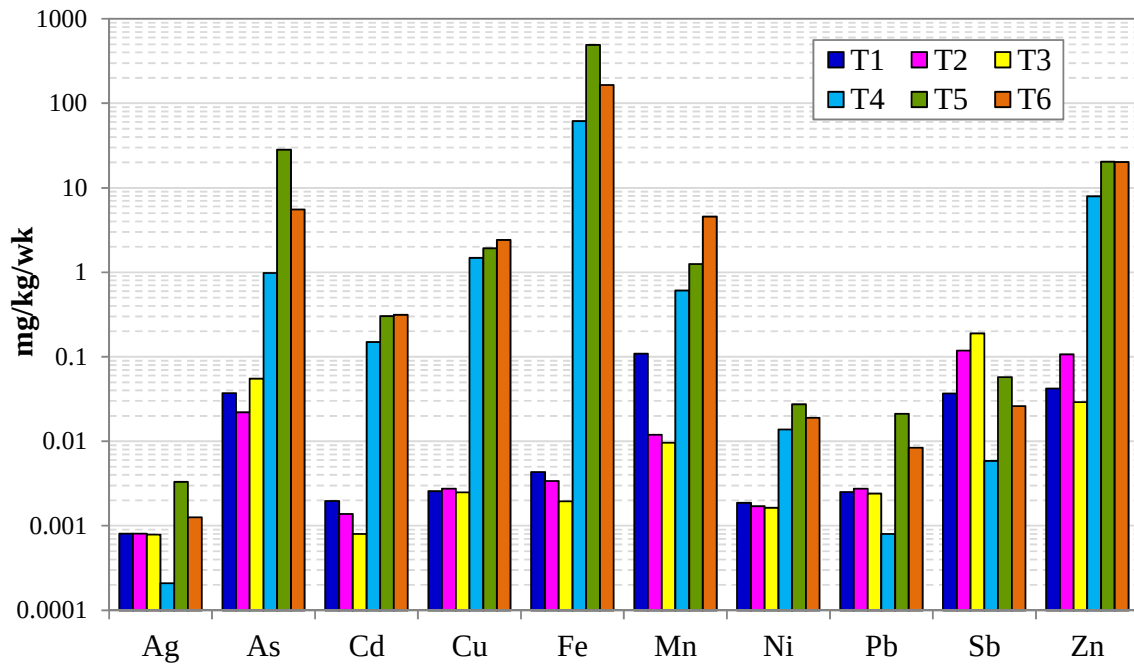


Figure 4-6: Average Metal (Ag, As, Cd, Cu, Fe, Mn, Pb, Ni, Sb and Zn) Release Rates from Final Five Weeks of Tailings Humidity Cell Testing

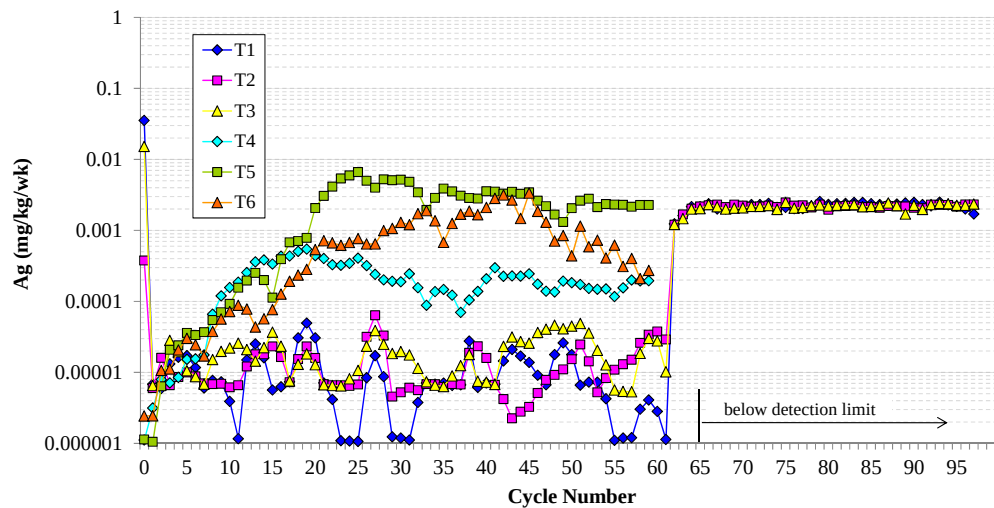


Figure 4-7: Weekly Silver Loads in Tailings Humidity Cell Leachate

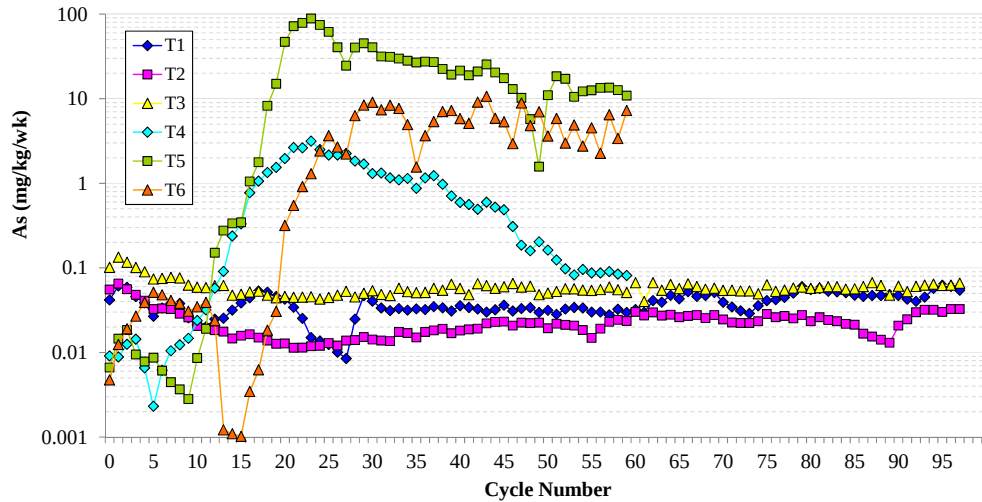


Figure 4-8: Weekly Arsenic Loads in Tailings Humidity Cell Leachate

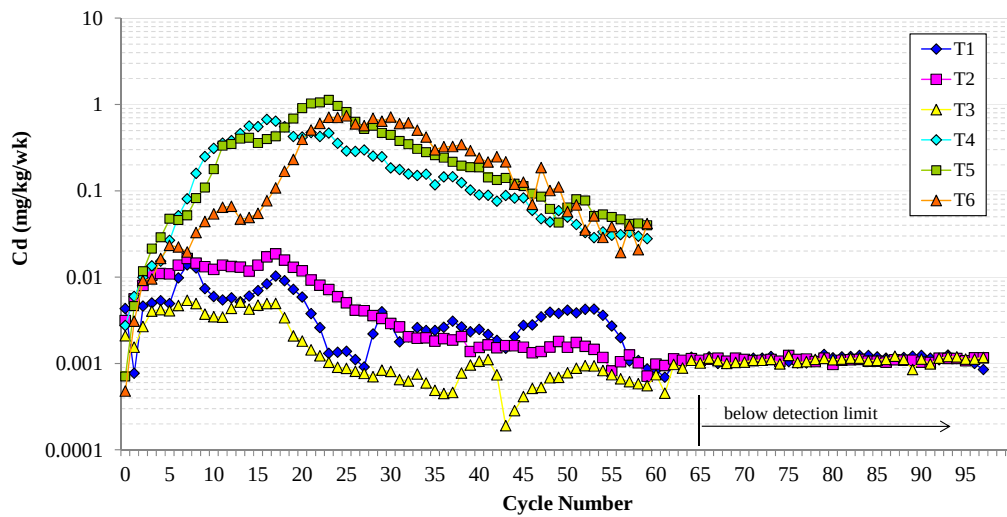


Figure 4-9: Weekly Cadmium Loads in Tailings Humidity Cell Leachate

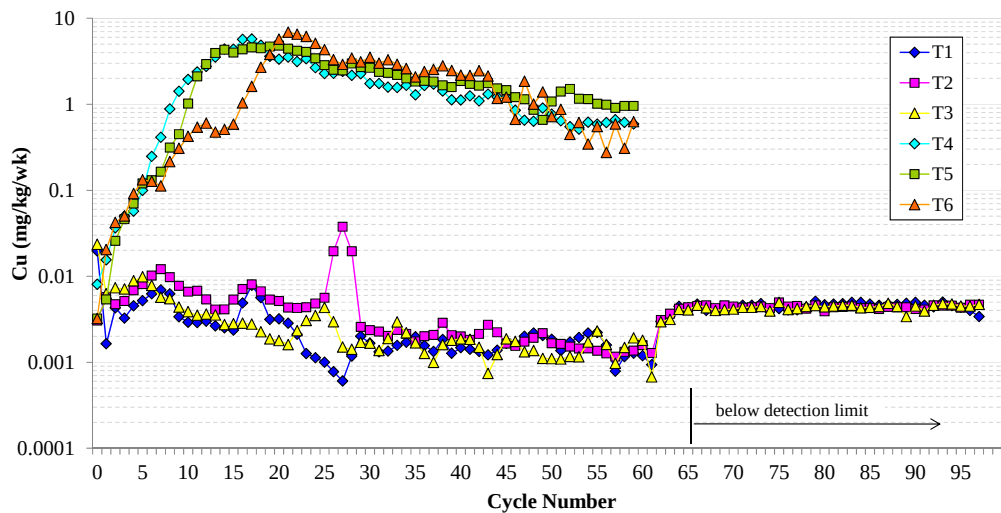


Figure 4-10: Weekly Copper Loads in Tailings Humidity Cell Leachate

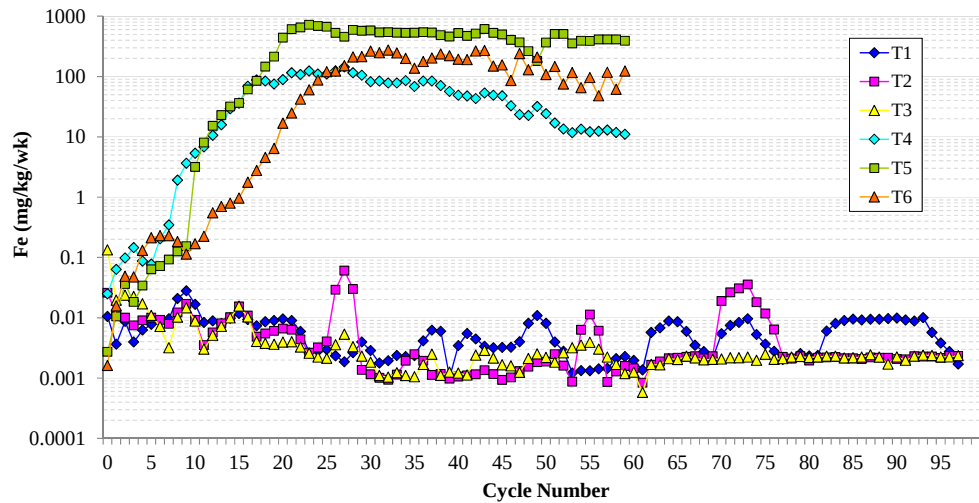


Figure 4-11: Weekly Iron Loads in Tailings Humidity Cell Leachate

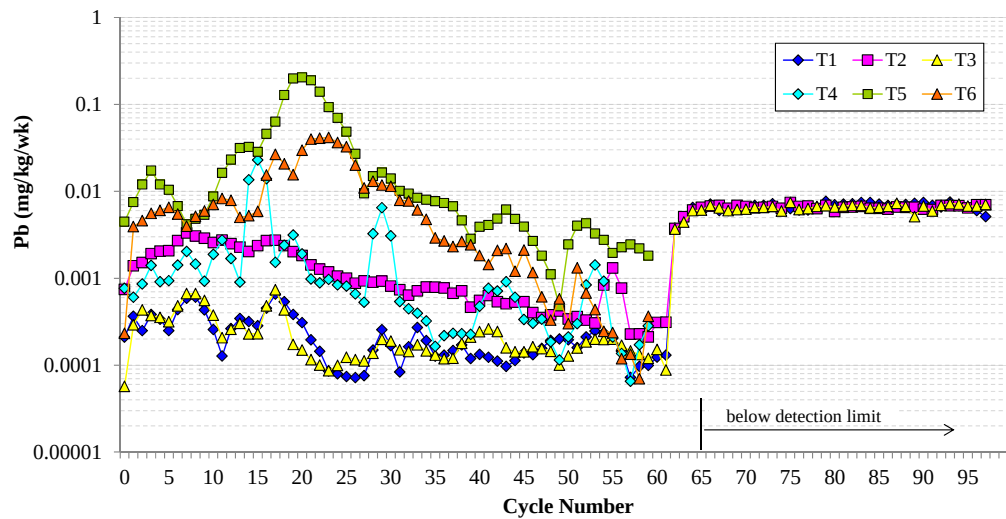


Figure 4-12: Weekly Lead Loads in Tailings Humidity Cell Leachate

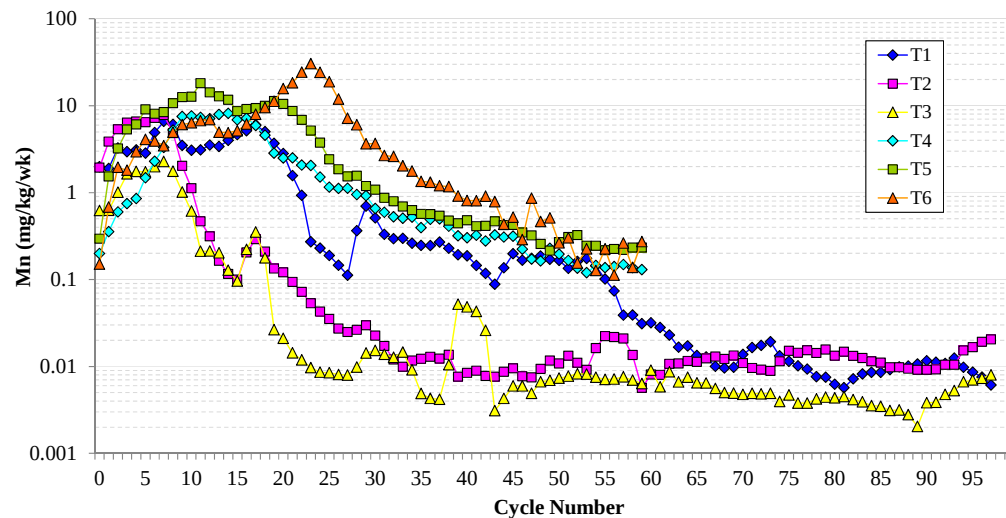


Figure 4-13: Weekly Manganese Loads in Tailings Humidity Cell Leachate

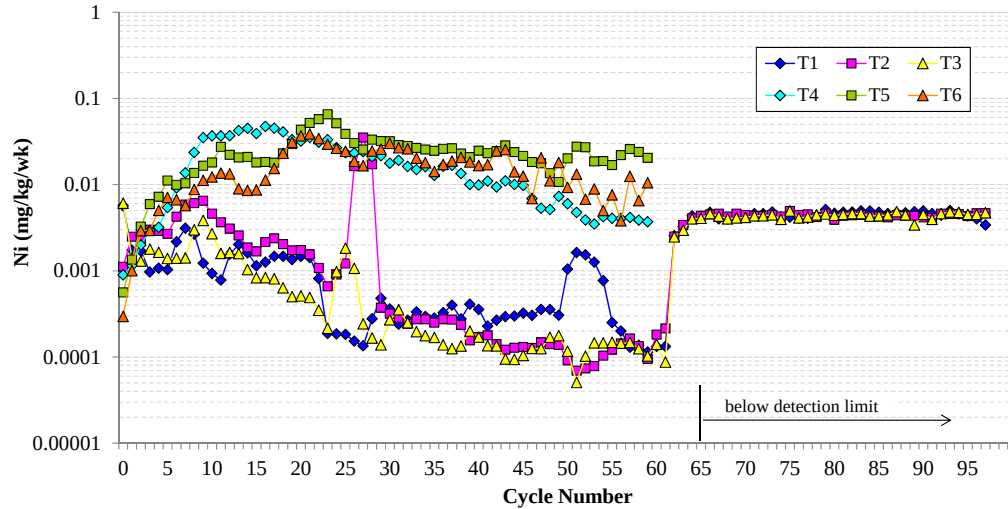


Figure 4-14: Weekly Nickel Loads in Tailings Humidity Cell Leachate

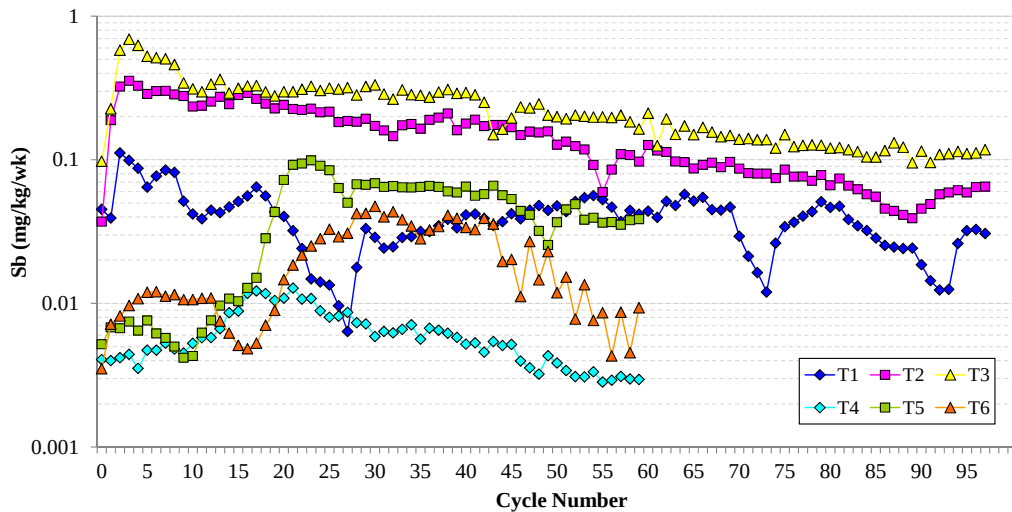


Figure 4-15: Weekly Antimony Loads in Tailings Humidity Cell Leachate

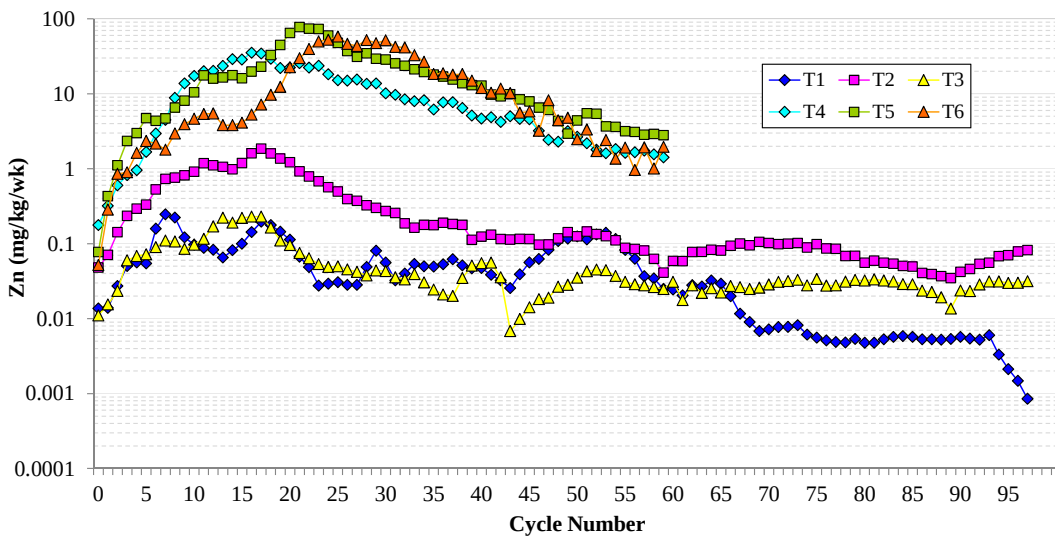


Figure 4-16: Weekly Zinc Loads in Tailings Humidity Cell Leachate

5. Summary of Key Findings

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The following summary discusses findings of each of the six humidity cell samples.

- A significant amount of solid-phase sulfate-sulfur was measured in the T1-T3 humidity cell residues suggesting that dissolving sulfates were contributing to sulfate measured in leachate.
- The paste pH and CaNP values in the T1-T3 humidity cell residues indicate that the materials had not become acid generating over the course of the experiment.
- pH in leachate remained neutral (7.2-8.0) in T1-T3 and dropped to 1.9-2.5 in the pre-treated T4-T6 cells. It is predicted that upon removal of all available carbonates, the pH in the Mount Nansen tailings could decrease to ~2.
- Sulfate production rates at the end of the lab-based kinetic experiments were lowest in T1 (untreated clay, <10 mg/kg/wk) and highest in T5 (pre-treated silty sand, 1000-1600 mg/kg/wk). Sulfate production rates were moderate in T2 and T3 (<120 mg/kg/wk), and elevated in T4 (125-185 mg/kg/wk) and T6 (450 mg/kg/wk).
- Sulfide (pyrite) oxidation is the dominant reaction contributing to Fe and S concentrations in solution in T4-T6.
- It will take less than 25 years for all the CaNP to be consumed in the Mount Nansen tailings under the conditions of the lab-based kinetic experiments, and as low as 6.4 years in the silty-sand tailings. The onset of acidic drainage is expected to coincide with the depletion of CaNP.
- Concentrations of As, Cd, Cu, Fe, Ni, Pb and Zn in the acidic leachate from T4-T6 are up to three orders of magnitude higher than their non-treated counterparts (T1-T3). These results suggest that metal leaching from the Mount Nansen tailings will be higher under acidic conditions.

References

References

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***Appendix A1:
Static Test Results for the
Humidity Cell Materials***

Appendix A-1

Static testing results before humidity cell experiments

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Static Testing Results

Sample ID	Material	Paste pH	TIC %	CaCO3 NP	S(T) %	S(SO4) %	S(S-2) %	Insoluble S %	AP	NP	Net NP	Fizz Test	Ag ppb	Al %	As ppm	Au ppb	B ppm	Ba ppm	Bi ppm	Ca %	Cd ppm	Co ppm	Cr ppm	Cu ppm	Fe %	Ga ppm
T1	Clay Composite	7.97	0.44	36.7	2.28	1.22	0.98	0.08	30.6	42.1	11.5	Slight	26165	0.51	3428	807	<20	113	33.94	1.65	46.31	5.5	19.6	427.5	5.4	1.6
T2	Sand Silt Composite	7.51	0.36	30.0	4.85	0.72	3.84	0.29	120.0	31.5	-88.5	Slight	46122	0.27	3792	2645	<20	36	35.41	1.17	36.34	6.6	20.7	432.7	6.6	1.1
T3	Silt Clay Composite	8.06	0.34	28.3	2.22	0.74	1.06	0.42	33.1	34.3	1.2	Slight	34124	0.34	3170	747	<20	90.4	24.28	1.39	36.32	4.6	17.4	478.7	4.7	1.2

Appendix A-1

Static testing results before humidity tests

Static Testing Results

Sample ID	Material	Paste pH	Hg ppb	K %	La ppm	Mg %	Mn ppm	Mo ppm	Na %	Ni ppm	P %	Pb ppm	S %	Sb ppm	Sc ppm	Se ppm	Sr ppm	Te ppm	Th ppm	Ti %	Tl ppm	U ppm	V ppm	W ppm	Zn ppm
T1	Clay Composite	7.97	431	0.31	6	0.29	3490	1.62	0.051	6.6	0.063	2455	2.09	135.99	3.4	0.6	72	0.47	2.7	0.002	1.25	1	19	<0.1	2994.5
T2	Sand Silt Composite	7.51	262	0.17	3.3	0.22	2421	1.52	0.006	4.3	0.041	2234	4.98	230.17	1.9	1	55	0.54	1.6	0.001	0.96	0.7	11	<0.1	2363.7
T3	Silt Clay Composite	8.06	231	0.21	4.7	0.21	2095	1.37	0.016	4.5	0.055	1704	2.22	209.8	2.3	0.7	55.7	0.35	2	0.002	0.82	0.8	14	<0.1	2361.1

Appendix A-1

Static testing results after humidity cell experiments

Static Testing Results

Sample ID	Material	Final Dry Wt. g	Paste pH	TIC %	CaCO3 NP	S(T) %	S(SO4) %	S(S-2) %	Insoluble S %	AP	NP	Net NP	Fizz Test	Ag ppb	Al %	As ppm	Au ppb	B ppm	Ba ppm	Bi ppm	Ca %	Cd ppm	Co ppm	Cr ppm	Cu ppm
T1	Clay Composite	884	8.05	0.3	25.0	1.4	0.53	0.83	0.04	25.9	36.6	10.6	slight	27416	0.49	3628	887	<20	158	32.9	0.73	44	5.6	20	457
T2	Sand Silt Composite	906	7.62	0.25	20.8	4.38	0.29	3.83	0.26	119.7	24.5	-95.2	slight	44175	0.22	3733	4440	<20	53.6	30.9	0.44	31	6.5	24.8	414
T3	Silt Clay Composite	977	7.90	0.21	17.5	1.64	0.31	1.28	0.05	40.0	23.8	-16.2	slight	30561	0.3	3105	1905	<20	106	21	0.52	31	4.5	23	429

Appendix A-1

Static testing results after humidity cell experiments

Static Testing Results

Sample ID	Material	Final Dry Wt. g	Paste pH	Fe %	Ga ppm	Hg ppb	K %	La ppm	Mg %	Mn ppm	Mo ppm	Na %	Ni ppm	P %	Pb ppm	S %	Sb ppm	Sc ppm	Se ppm	Sr ppm	Te ppm	Th ppm	Ti %	Tl ppm	U ppm	V ppm	W ppm	Zn ppm
T1	Clay Composite	884	8.05	5.7	1.5	506	0.28	6	0.2	3413	1.78	0.01	6.7	0.068	2600	1.31	190	2.9	0.6	59.1	0.64	2.7	0	1.23	1	19	<0.1	3011
T2	Sand Silt Composite	906	7.62	6.4	0.8	265	0.15	3	0.2	2482	1.24	0	4.6	0.043	2192	4.07	237	1.6	0.7	35	0.56	1.7	0	0.91	0.7	11	<0.1	2302
T3	Silt Clay Composite	977	7.90	4.4	0.9	246	0.17	4.5	0.2	2200	1.2	0.01	4.7	0.056	1704	1.56	214	2	0.3	36.6	0.38	1.9	0	0.81	0.7	13	<0.1	2231

Appendix A2:
Humidity Cell Leachate Results

Appendix A-2
Humidity Cell T1 (Clay Composite)
Results of Leachate Analysis

Date	Cycle No.	Volume mL		pH	Cond. umhos/cm	Acidity (pH 4.5)	Acidity (pH 8.3)	Alkalinity	Sulphate	Chloride	Hardness	Al	Sb	As	Ba	Be	Bi	B	Cd	Ca	Cr	Co	Cu	Fe
		Input	Output			mg CaCO ₃ /L	mg CaCO ₃ /L	mg CaCO ₃ /L	mg/L	mg/L	ng CaCO ₃ /I	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
28-Jul-09	0	750	210	7.45	4548	#N/A	22.2	67.2	2640	340	1970	<0.02	0.215	0.199	0.034	<0.001	<0.0005	<5	0.0206	565	<0.01	0.0158	0.094	<0.1
04-Aug-09	1	500	455	7.28	2019	#N/A	9.2	21.8	1224	18	1020	0.008	0.0862	0.134	0.0093	<0.00005	<0.00003	<0.3	0.00169	352	<0.0005	0.00395	0.0036	0.008
11-Aug-09	2	500	395	7.49	2799	#N/A	12.4	41.0	2032	2.8	1580	0.006	0.282	0.149	0.0113	<0.00005	<0.00003	<0.3	0.0117	535	<0.0005	0.00439	0.0109	0.022
18-Aug-09	3	500	440	7.42	2194	#N/A	9.8	34.1	1445	1.9	1290	0.004	0.225	0.104	0.0114	<0.00005	<0.00003	<0.3	0.0114	450	<0.0005	0.00267	0.0074	0.009
25-Aug-09	4	500	465	7.50	2049				1361															
01-Sep-09	5	500	430	7.58	1897	#N/A	9.0	37.3	1264	1	1130	0.011	0.15	0.0621	0.0136	<0.00005	<0.00003	<0.3	0.0115	393	<0.0005	0.00245	0.0121	0.018
08-Sep-09	6	500	425	7.31	1518				1006															
15-Sep-09	7	500	400	7.59	2560	#N/A	14.4	84.7	1587	0.9	1650	0.004	0.212	0.0953	0.0209	<0.00005	<0.00003	<0.3	0.0346	550	<0.0005	0.00738	0.0173	0.024
22-Sep-09	8	500	515	7.38	2405				1798															
29-Sep-09	9	500	490	7.37	1384	#N/A	7.6	39.1	1022	<0.5	850	0.004	0.105	0.0523	0.0108	<0.00005	<0.00003	<0.3	0.015	301	<0.0005	0.00869	0.0069	0.057
06-Oct-09	10	500	445	7.31	1474				1094															
13-Oct-09	11	500	465	7.48	1322	#N/A	4.8	33.2	713	<0.5	765	0.0041	0.0835	0.0431	0.0112	<0.00001	<0.000005	<0.05	0.0117	276	<0.0001	0.0185	0.00622	0.018
20-Oct-09	12	500	480	7.37	1218				817															
27-Oct-09	13	500	420	7.41	1772	#N/A	4.9	26.7	1198	0.8	1070	0.006	0.102	0.0603	0.0098	<0.00005	<0.00003	<0.3	0.0123	392	<0.0005	0.0228	0.0063	0.019
03-Nov-09	14	500	445	7.27	1765				1189															
10-Nov-09	15	500	470	7.10	1802	#N/A	7.7	28.2	1290	1.5	1160	0.0038	0.109	0.0817	0.011	<0.00001	<0.000005	0.052	0.0148	424	<0.0001	0.0268	0.00501	0.025
17-Nov-09	16	500	465	7.18	1876				1292															
24-Nov-09	17	500	490	7.62	2165	#N/A	5.7	46.5	1444	1.4	1380	0.003	0.132	0.108	0.0116	<0.00005	<0.00003	<0.3	0.021	506	<0.0005	0.0272	0.016	0.015
01-Dec-09	18	500	490	7.50	1970				1338															
08-Dec-09	19	500	450	7.32	2047	#N/A	8.3	52.5	1305	<0.5	1330	0.003	0.0966	0.102	0.0105	<0.00005	<0.00003	<0.3	0.016	485	<0.0005	0.0241	0.007	0.02
15-Dec-09	20	500	490	7.36	1085				680															
22-Dec-09	21	500	475	7.60	1274	#N/A	4.0	36.6	737	<0.5	854	0.007	0.0676	0.0719	0.0097	<0.00005	<0.00003	<0.3	0.00795	310	<0.0005	0.0129	0.006	0.019
29-Dec-09	22	500	475	7.53	1075				635															
05-Jan-10	23	500	435	7.30	771	#N/A	3.8	22.2	378	<0.5	404	0.0047	0.034	0.0344	0.00715	<0.00001	<0.000005	<0.05	0.00301	145	<0.0001	0.00525	0.00289	0.006
12-Jan-10	24	500	430	7.31	641				326															
19-Jan-10	25	500	425	7.38	791	#N/A	5.0	23.5	463	<0.5	431	0.0067	0.0316	0.0292	0.00847	<0.00001	<0.000005	<0.05	0.00325	153	0.0001	0.00521	0.00236	0.007
26-Jan-10	26	500	425	7.23	325				162															
02-Feb-10	27	500	465	7.01	264	#N/A	2.9	9.8	157	<0.5	160	0.0054	0.0137	0.0182	0.00654	<0.00001	<0.000005	<0.05	0.00196	56.6	<0.0001	0.00165	0.0013	0.004
09-Feb-10	28	500	440	7.51	1466				927															
16-Feb-10	29	500	495	7.39	1509	#N/A	6.0	36.5	1028	9.2	1100	0.0038	0.0671	0.0945	0.0103	<0.00001	<0.000005	<0.05	0.00801	389	<0.0001	0.00954	0.00405	0.008
23-Feb-10	30	500	475	7.50	1134				816															
02-Mar-10	31	500	445	7.53	1208	#N/A	3.1	29.3	724	7.3	798	0.0055	0.0544	0.0753	0.00778	<0.00001	<0.000005	<0.05	0.00399	281	<0.0001	0.00792	0.00297	0.004
09-Mar-10	32	500	430	7.45	1508				1017															
16-Mar-10	33	500	475	7.44	1336	#N/A	4.9	33.3	819	4.8	901	0.006	0.0605	0.0696	0.0078	<0.00005	<0.00003	<0.3	0.00546	320	<0.0005	0.00799	0.0033	0.005
23-Mar-10	34	500	455	7.52	1551				1110															
30-Mar-10	35	500	470	7.52	1627	#N/A	4.4	39.6	1114	3.3	1020	0.006	0.0675	0.0696	0.0089	<0.00005	<0.00003	<0.3	0.00511	364	<0.0005	0.00878	0.0042	0.005
06-Apr-10	36	500	435	7.53	1729				1029															
13-Apr-10	37	500	445	7.55	1883	#N/A	7.5	46.9	1297	2	1260	0.007	0.078	0.078	0.0115	<0.00005	<0.00003	<0.3	0.00694	454	<0.0005	0.0109	0.003	0.014
20-Apr-10	38	500	460	7.65	1791	#N/A	5.6	50.6	1149	2	1090	0.007	0.0836	0.0732	0.0129	<0.00005	<0.00003	<0.3	0.00575	392	<0.0005	0.00898	0.004	0.013
27-Apr-10	39	500	410	7.66	1774	#N/A	3.5	48.0	1169	1.6	1120	0.006	0.0817	0.0754	0.0111	<0.00005	<0.00003	<0.3	0.00568	405	<0.0005	0.00905	0.0031	<0.005
04-May-10	40	500	475	7.60	1661				1073															
11-May-10	41	500	455	7.64	1546	#N/A	5.6	49.1	949	1.3	950	0.009	0.0922	0.0748	0.0103	<0.00005	<0.00003	<0.3	0.00476	346	<0.0005	0.0061	0.0031	0.012
18-May-10	42	500	445	7.53	1378				797															
25-May-10	43	500	420	7.54	1289	#N/A	7.7	44.9	602	<0.5	813	0.008	0.0831	0.0714	0.0106	<0.00005	<0.00003	<0.3	0.00356	297	<0.0005	0.00533	0.0029	0.008
01-Jun-10	44	500	425	7.59	1214				623															
08-Jun-10	45	500	460	7.70	1594	#N/A	5.9	54.3	1058	0.8	1310	0.007	0.0914	0.0785	0.0139	<0.00005	<0.00003	<0.3	0.00602	481	<0.0005	0.00843	0.0036	0.007
15-Jun-10	46	500	405	7.78	1607				771															
22-Jun-10	47	500	445	7.80	1783	#N/A	5.9	68.5	1001	<0.5	1170	0.006	0.1	0.074	0.0136	<0.00005	<0.00003	<0.3	0.00778	430	<0.0005	0.00667	0.0045	0.009
29-Jun-10	48	500	475	7.51	1717				823															
06-Jul-10	49	500	435	7.84	1494	#N/A	4.9	72.2	848	<0.5	1090	0.017	0.102	0.0682	0.0129	<0.00005	<0.00003	<0.3	0.0087	404	<0.0005	0.00502	0.0047	0.025
13-Jul-10	50	500	475	7.71	1351				511															
20-Jul-10	51	500	440	7.70	1526	#N/A	8.4	80.8	840	2.9	1050	0.006	0.0989	0.0641	0.0129	<0.00005	<0.00003	<0.3	0.00874	392	<0.0005	0.00605	0.0031	0.009

Appendix A-2
Humidity Cell T1 (Clay Composite)
Results of Leachate Analysis

Date	Cycle No.	Volume mL		pH	Cond. umhos/cm	Acidity (pH 4.5)	Acidity (pH 8.3)	Alkalinity	Sulphate	Chloride	Hardness	Al	Sb	As	Ba	Be	Bi	B	Cd	Ca	Cr	Co	Cu	Fe
		Input	Output			mg CaCO ₃ /L	mg CaCO ₃ /L	mg CaCO ₃ /L	mg/L	mg/L	ng CaCO ₃ /I	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
27-Jul-10	52	500	485	7.78	1644				1124															
03-Aug-10	53	500	485	7.85	1290	#N/A	7.8	83.8	754	<0.5	867	0.006	0.112	0.0699	0.0128	<0.00005	<0.00003	<0.3	0.00876	324	<0.0005	0.00456	0.004	<0.005
10-Aug-10	54	500	485	7.83	1223				813															
17-Aug-10	55	500	440	7.92	960	#N/A	5.4	80.2	429	0.8	602	0.006	0.12	0.0682	0.0131	<0.00001	<0.000005	<0.05	0.00616	224	<0.0001	0.00305	0.00503	0.003
24-Aug-10	56	500	475	7.73	666				239															
31-Aug-10	57	500	481	7.77	393	#N/A	7.8	43.3	212	<0.5	206	0.0063	0.0771	0.0578	0.00877	<0.00001	<0.000005	<0.05	0.00221	75.4	<0.0001	0.00081	0.00164	0.003
07-Sep-10	58	500	525	7.61	651				383															
14-Sep-10	59	500	455	7.57	408	#N/A	4.3	50.4	155	<0.5	233	0.0075	0.092	0.0654	0.00943	<0.00001	0.000015	<0.05	0.0019	85.5	0.0001	0.00111	0.00279	0.005
21-Sep-10	60	500	490	7.72	418				246															
28-Sep-10	61	500	455	7.67	310	#N/A	3.0	46.7	119	0.9	149	0.0055	0.0873	0.0654	0.00966	<0.00001	<0.000005	<0.05	0.00152	53.9	0.0002	0.0008	0.00206	0.003
05-Oct-10	62	500	495	7.57	325																			
12-Oct-10	63	500	430	7.76	239				112															
19-Oct-10	64	500	495	7.64	227																			
26-Oct-10	65	500	430	7.57	194	#N/A	2.8	41.9	64	#N/A	96.3	<0.05	0.12	0.1	0.009	<0.003	<0.05	<0.01	<0.005	34.2	<0.01	<0.02	<0.02	0.02
02-Nov-10	66	500	475	7.77	219																			
09-Nov-10	67	500	400	7.66	199				47															
16-Nov-10	68	500	400	7.94	389																			
23-Nov-10	69	500	425	7.72	220	#N/A	3.6	64.2	54	#N/A	110	<0.05	0.11	0.12	0.02	<0.003	<0.05	<0.01	<0.005	38.4	<0.01	<0.02	<0.02	<0.01
30-Nov-10	70	500	435	7.66	142																			
07-Dec-10	71	500	460	7.71	144				22															
14-Dec-10	72	500	460	7.71	130																			
21-Dec-10	73	500	480	7.54	89	#N/A	5.1	30.8	16	#N/A	42.1	<0.05	<0.05	0.06	0.011	<0.003	<0.05	<0.01	<0.005	14.4	<0.01	<0.02	<0.02	0.02
28-Dec-10	74	500	420	7.72	102																			
04-Jan-11	75	500	420	7.79	128				27															
11-Jan-11	76	500	405	7.60	109																			
18-Jan-11	77	500	405	7.68	143	#N/A	3.0	45.7	27	#N/A	71.1	<0.05	0.1	0.11	0.017	<0.003	<0.05	<0.01	<0.005	24.3	<0.01	<0.02	<0.02	<0.01
25-Jan-11	78	500	435	7.70	138																			
01-Feb-11	79	500	510	7.65	101				16															
08-Feb-11	80	500	465	7.83	119																			
15-Feb-11	81	500	475	7.67	134	#N/A	3.1	50.2	16	#N/A	67.8	<0.05	0.1	0.12	0.017	<0.003	<0.05	<0.01	<0.005	22.9	<0.01	<0.02	<0.02	<0.01
22-Feb-11	82	500	480	7.82	115																			
01-Mar-11	83	500	495	7.61	87				18															
08-Mar-11	84	500	495	7.63	78																			
15-Mar-11	85	500	475	7.70	104	#N/A	2.9	40.1	12	#N/A	49.5	<0.05	0.06	0.1	0.014	<0.003	<0.05	<0.01	<0.005	16.6	<0.01	<0.02	<0.02	0.02
22-Mar-11	86	500	460	7.82	127																			
29-Mar-11	87	500	470	7.96	145				16															
05-Apr-11	88	500	470	7.63	111																			
12-Apr-11	89	500	485	7.63	95	#N/A	3.3	41.9	10	#N/A	44.5	<0.05	0.05	0.1	0.013	<0.003	<0.05	<0.01	<0.005	14.8	<0.01	<0.02	<0.02	0.02
19-Apr-11	90	500	495	7.79	82																			
26-Apr-11	91	500	460	7.78	107				12															
03-May-11	92	500	440	7.82	191																			
10-May-11	93	500	500	7.64	85	#N/A	3.3	39.5	11	#N/A	42.4	<0.05	<0.05	0.09	0.013	<0.003	<0.05	<0.01	<0.005	13.8	<0.01	<0.02	<0.02	0.02
17-May-11	94	500	455	7.71	221																			
24-May-11	95	500	435	7.67	37				5															
31-May-11	96	500	400	7.58	52																			
07-Jun-11	97	500	340	7.74	82	#N/A	2.7	33.9	6	#N/A	41.9	<0.05	0.09	0.16	0.011	<0.003	<0.05	<0.01	<0.005	13.8	<0.01	<0.02	<0.02	<0.01
14-Jun-11	98	500	430	7.86	61																			

Notes: Values in red are below the detection limit. For calculation purposes, values below detection were set at half the value of the analytical limit.

Appendix A-2

Humidity Cell T1 (Clay Composite)

Results of Leachate Analysis

Date	Cycle No.	Volume mL		Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl	Sn	Ti	U	V	Zn	Zr
		Input	Output	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
28-Jul-09	0	750	210	0.001	<0.05	135	9.43	69	0.034	0.027	<0.2	85	0.004	<10	0.168	520	1.57	1500	0.0049	0.019	<0.05	0.0016	<0.02	0.065	<0.01
04-Aug-09	1	500	455	0.0008	0.011	35.3	4.16	0.28	0.0082	0.0038	<0.01	26.9	0.0004	2.57	<0.00003	91.4	0.632	457	0.00217	0.00474	<0.003	0.00028	<0.001	0.0305	<0.0005
11-Aug-09	2	500	395	0.00063	0.017	59.6	8.26	<0.05	0.0121	0.0043	<0.01	37.8	0.0005	4.76	<0.00003	136	1.05	675	0.00312	0.0071	<0.003	0.00066	<0.001	0.0688	<0.0005
18-Aug-09	3	500	440	0.00087	0.014	40.2	6.72	<0.05	0.0076	0.0022	<0.01	29.4	0.0007	2.84	0.00003	73.7	0.77	539	0.00243	0.00444	<0.003	0.00033	<0.001	0.114	<0.0005
25-Aug-09	4	500	465																						
01-Sep-09	5	500	430	0.00058	0.013	37.2	6.6	<0.05	0.0053	0.0024	<0.01	22.1	0.0003	2.83	0.00004	48.3	0.697	381	0.00199	0.00289	<0.003	0.00023	<0.001	0.127	<0.0005
08-Sep-09	6	500	425																						
15-Sep-09	7	500	400	0.00147	0.025	66.4	16.5	0.12	0.0059	0.0078	<0.01	28.6	0.0006	6.86	<0.00003	56.1	1.18	631	0.00236	0.00512	<0.003	0.00039	<0.001	0.616	<0.0005
22-Sep-09	8	500	515																						
29-Sep-09	9	500	490	0.00088	0.01	24.3	7.11	<0.05	0.003	0.0025	<0.01	10.4	0.0003	2.93	<0.00003	11.3	0.491	300	0.00062	0.00291	<0.003	0.00011	<0.001	0.247	<0.0005
06-Oct-09	10	500	445																						
13-Oct-09	11	500	465	0.000273	0.0087	18.4	6.66	0.01	0.00243	0.00168	0.004	7.89	0.00012	2.43	<0.000005	6.16	0.439	283	0.000398	0.00188	<0.0005	0.000105	<0.0002	0.189	<0.0001
20-Oct-09	12	500	480																						
27-Oct-09	13	500	420	0.00082	0.011	21.6	8.06	0.09	0.0033	0.0048	<0.01	8.78	<0.0002	3.48	0.00006	5.79	0.578	377	0.00057	0.00391	<0.003	0.00013	<0.001	0.155	<0.0005
03-Nov-09	14	500	445																						
10-Nov-09	15	500	470	0.000603	0.012	23.9	9.88	0.04	0.00327	0.00243	0.006	8.94	0.00017	4.16	0.000012	4.44	0.638	432	0.000489	0.00302	<0.0005	0.000155	<0.0002	0.212	<0.0001
17-Nov-09	16	500	465																						
24-Nov-09	17	500	490	0.00134	0.014	28.5	12.3	<0.05	0.0033	0.003	<0.01	8.93	<0.0002	5.87	<0.00003	3.65	0.743	483	0.00059	0.00566	<0.003	0.00028	<0.001	0.4	<0.0005
01-Dec-09	18	500	490																						
08-Dec-09	19	500	450	0.00085	0.014	28	8.19	0.08	0.0026	0.003	<0.01	7.56	0.0002	4.7	0.00011	2.3	0.679	433	0.00049	0.00144	0.004	0.00047	<0.001	0.32	<0.0005
15-Dec-09	20	500	490																						
22-Dec-09	21	500	475	0.00041	0.01	19.2	3.3	<0.05	0.0015	0.003	<0.01	5.7	<0.0002	3.37	<0.00003	1.36	0.431	291	0.00032	0.003	<0.003	0.00027	<0.001	0.141	<0.0005
29-Dec-09	22	500	475																						
05-Jan-10	23	500	435	0.000196	0.0047	10.3	0.625	0.01	0.00067	0.00043	<0.002	2.88	0.00008	1.75	<0.000005	0.58	0.199	141	0.000161	0.00235	<0.0005	0.00017	<0.0002	0.0633	<0.0001
12-Jan-10	24	500	430																						
19-Jan-10	25	500	425	0.000174	0.0044	11.5	0.445	<0.01	0.00063	0.00043	0.007	2.92	0.00019	1.89	<0.000005	0.56	0.201	144	0.000151	0.00255	0.0006	0.000103	<0.0002	0.072	<0.0001
26-Jan-10	26	500	425																						
02-Feb-10	27	500	465	0.000163	0.0017	4.44	0.241	<0.01	0.00026	0.00029	<0.002	1.09	<0.00004	0.893	0.000037	0.26	0.07	53	0.000071	0.00132	<0.0005	0.000028	<0.0002	0.0606	<0.0001
09-Feb-10	28	500	440																						
16-Feb-10	29	500	495	0.000516	0.0095	30.6	1.41	0.01	0.0012	0.00097	0.002	5.85	0.00016	6.19	<0.000005	1.08	0.531	379	0.000358	0.00583	<0.0005	0.000391	<0.0002	0.162	<0.0001
23-Feb-10	30	500	475																						
02-Mar-10	31	500	445	0.000187	0.0074	23.3	0.744	0.01	0.00119	0.00054	0.004	4.6	0.00015	3.28	<0.000005	0.72	0.366	268	0.00024	0.00498	<0.0005	0.000299	<0.0002	0.0727	<0.0001
09-Mar-10	32	500	430																						
16-Mar-10	33	500	475	0.00057	0.008	24.5	0.627	<0.05	0.0011	0.0007	<0.01	4.2	<0.0002	3.4	<0.00003	0.6	0.407	316	0.00027	0.00443	<0.003	0.0004	<0.001	0.113	<0.0005
23-Mar-10	34	500	455																						
30-Mar-10	35	500	470	0.00027	0.009	27	0.525	<0.05	0.0034	0.0006	<0.01	4.3	<0.0002	2.41	<0.00003	0.61	0.432	339	0.00021	0.00757	<0.003	0.00054	<0.001	0.105	<0.0005
06-Apr-10	36	500	435																						
13-Apr-10	37	500	445	0.00033	0.009	31.7	0.604	<0.05	0.0018	0.0009	<0.01	4.6	<0.0002	4.25	<0.00003	0.5	0.515	422	0.00027	0.0109	<0.003	0.00082	<0.001	0.139	<0.0005
20-Apr-10	38	500	460	0.00037	0.01	27.8	0.496	<0.05	0.0018	0.0006	<0.01	4.2	<0.0002	3.62	0.00006	0.5	0.476	342	0.00027	0.0122	<0.003	0.00079	<0.001	0.111	<0.0005
27-Apr-10	39	500	410	0.00029	0.009	27.2	0.469	<0.05	0.0016	0.001	<0.01	4.2	0.0003	3.77	<0.00003	0.5	0.446	383	0.00021	0.0103	<0.003	0.00079	<0.001	0.114	<0.0005
04-May-10	40	500	475																						
11-May-10	41	500	455	0.00027	0.007	20.8	0.319	<0.05	0.0016	0.0005	<0.01	3.8	0.0007	3.95	<0.00003	0.4	0.389	339	0.00025	0.00942	<0.003	0.00071	<0.001	0.0844	<0.0005
18-May-10	42																								

Appendix A-2

Humidity Cell T1 (Clay Composite)

Results of Leachate Analysis

Date	Cycle No.	Volume mL		Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl	Sn	Ti	U	V	Zn	Zr
		Input	Output	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
27-Jul-10	52	500	485																						
03-Aug-10	53	500	485	0.00051	0.007	14.2	0.36	<0.05	0.0016	0.0026	<0.01	2.9	<0.0002	4.07	<0.00003	<0.3	0.329	311	0.00024	0.00734	<0.003	0.00103	<0.001	0.287	<0.0005
10-Aug-10	54	500	485																						
17-Aug-10	55	500	440	0.00046	0.0057	10.3	0.23	<0.01	0.00141	0.00057	0.004	2.39	0.0001	3.82	<0.000005	0.26	0.223	198	0.000196	0.00529	<0.0005	0.000709	<0.0002	0.187	<0.0001
24-Aug-10	56	500	475																						
31-Aug-10	57	500	481	0.00015	0.0023	4.35	0.0806	<0.01	0.00084	0.00027	0.004	1.11	0.00007	1.68	<0.000005	0.14	0.0795	63	0.000087	0.00098	<0.0005	0.000172	<0.0002	0.0763	<0.0001
07-Sep-10	58	500	525																						
14-Sep-10	59	500	455	0.000218	0.0028	4.66	0.0681	<0.01	0.00114	0.00025	0.003	1.28	0.00006	2.53	0.000009	0.18	0.0828	65	0.000092	0.00145	<0.0005	0.000218	<0.0002	0.0546	<0.0001
21-Sep-10	60	500	490																						
28-Sep-10	61	500	455	0.000286	0.0021	3.39	0.0617	<0.01	0.00119	0.00029	<0.002	0.98	0.00029	2.12	<0.000005	0.19	0.0589	40	0.000084	0.00109	<0.0005	0.000169	<0.0002	0.0448	<0.0001
05-Oct-10	62	500	495																						
12-Oct-10	63	500	430																						
19-Oct-10	64	500	495																						
26-Oct-10	65	500	430	<0.03	#N/A	2.61	0.031	#N/A	<0.02	<0.02	<0.05	0.7	<0.1	1.78	<0.01	0.2	0.04	19.4	#N/A	<0.03	<0.005	#N/A	<0.01	0.068	<0.02
02-Nov-10	66	500	475																						
09-Nov-10	67	500	400																						
16-Nov-10	68	500	400																						
23-Nov-10	69	500	425	<0.03	#N/A	3.41	0.023	#N/A	<0.02	<0.02	<0.05	0.8	<0.1	2.48	<0.01	0.2	0.049	19.2	#N/A	<0.03	<0.005	#N/A	<0.01	0.016	<0.02
30-Nov-10	70	500	435																						
07-Dec-10	71	500	460																						
14-Dec-10	72	500	460																						
21-Dec-10	73	500	480	<0.03	#N/A	1.5	0.04	#N/A	<0.02	<0.02	<0.05	0.5	<0.1	1.06	<0.01	0.3	0.02	5.7	#N/A	<0.03	<0.005	#N/A	<0.01	0.017	<0.02
28-Dec-10	74	500	420																						
04-Jan-11	75	500	420																						
11-Jan-11	76	500	405																						
18-Jan-11	77	500	405	<0.03	#N/A	2.54	0.023	#N/A	<0.02	<0.02	<0.05	0.6	<0.1	2.28	<0.01	0.3	0.034	9.1	#N/A	<0.03	<0.005	#N/A	<0.01	0.012	<0.02
25-Jan-11	78	500	435																						
01-Feb-11	79	500	510																						
08-Feb-11	80	500	465																						
15-Feb-11	81	500	475	<0.03	#N/A	2.55	0.012	#N/A	<0.02	<0.02	<0.05	0.5	<0.1	2.27	<0.01	<0.1	0.033	7.3	#N/A	<0.03	<0.005	#N/A	<0.01	0.01	<0.02
22-Feb-11	82	500	480																						
01-Mar-11	83	500	495																						
08-Mar-11	84	500	495																						
15-Mar-11	85	500	475	<0.03	#N/A	1.94	0.018	#N/A	<0.02	<0.02	<0.05	0.4	<0.1	1.74	<0.01	<0.1	0.024	5.1	#N/A	<0.03	<0.005	#N/A	<0.01	0.012	<0.02
22-Mar-11	86	500	460																						
29-Mar-11	87	500	470																						
05-Apr-11	88	500	470																						
12-Apr-11	89	500	485	<0.03	#N/A	1.85	0.022	#N/A	<0.02	<0.02	<0.05	0.4	<0.1	1.69	<0.01	<0.1	0.022	4.6	#N/A	<0.03	<0.005	#N/A	<0.01	0.011	<0.02
19-Apr-11	90	500	495																						
26-Apr-11	91	500	460																						
03-May-11	92	500	440																						
10-May-11	93	500	500	<0.03	#N/A	1.89	0.025	#N/A	<0.02	<0.02	<0.05	<0.3	<0.1	1.43	<0.01	0.3	0.021	3.5	#N/A	<0.03	<0.005	#N/A	<0.01	0.012	<0.02
17-May-11	94	500	455																						
24-May-11	95	500	435																						
31-May-11	96	500	400																						
07-Jun-11	97	500	340	<0.03	#N/A	1.8	0.018	#N/A	<0.02	<0.02	<0.05	<0.3	<0.1	3.28	<0.01	0.2	0.02	3.1	#N/A	<0.03	<0.005	#N/A	<0.01	<0.005	<0.02
14-Jun-11	98	500	430																						

Notes: Values in red are below the detection limit. For calculation purposes, values below detection were set at half the value of the analytical limit.

Appendix A-2

Humidity Cell T2 (Sand-Silt Composite)

Results of Leachate Analysis

Date	Cycle No.	Volume mL		pH	Cond. umhos/cm	Acidity	Acidity	Alkalinity	Sulphate	Chloride	Hardness	Al	Sb	As	Ba	Be	Bi	B	Cd	Ca	Cr	Co	Cu	Fe
		Input	Output			mg CaCO ₃ /L	mg CaCO ₃ /L																	
28-Jul-09	0	750	440	7.49	1470	#N/A	8.0	20.4	936	6.3	882	0.0059	0.0843	0.126	0.011	<0.00001	<0.000005	<0.05	0.0071	315	<0.0001	0.00364	0.00695	0.059
04-Aug-09	1	500	400	7.33	2362	#N/A	6.7	24.9	1709	2.4	1630	0.005	0.472	0.163	0.0079	<0.00005	<0.00003	<0.3	0.014	551	<0.0005	0.00849	0.0143	0.029
11-Aug-09	2	500	400	7.50	2364	#N/A	10.9	27.9	1748	0.5	1700	0.003	0.808	0.14	0.0076	<0.00005	<0.00003	<0.3	0.02	580	<0.0005	0.00832	0.0118	0.025
18-Aug-09	3	500	440	7.39	2216	#N/A	7.9	26.3	1650	0.6	1640	0.004	0.805	0.109	0.0075	<0.00005	<0.00003	<0.3	0.0239	590	<0.0005	0.00786	0.0117	0.017
25-Aug-09	4	500	430	7.57	2160				1441															
01-Sep-09	5	500	400	7.48	2278	#N/A	12.0	30.3	1589	<0.5	1690	0.01	0.718	0.0812	0.0099	<0.0001	<0.00005	<0.5	0.0272	633	<0.001	0.00789	0.0202	0.025
08-Sep-09	6	500	440	7.37	2232				1606															
15-Sep-09	7	500	465	7.64	2209	#N/A	13.0	53.6	1508	<0.5	1490	0.004	0.649	0.0698	0.011	<0.00005	<0.00003	<0.3	0.0353	572	<0.0005	0.0105	0.026	0.017
22-Sep-09	8	500	455	7.57	2132				1559															
29-Sep-09	9	500	460	7.56	2147	#N/A	10.2	61.5	1783	<0.5	1580	0.002	0.604	0.0565	0.0099	<0.00005	<0.00003	<0.3	0.0286	594	<0.0005	0.00419	0.0168	0.037
06-Oct-09	10	500	410	7.45	2299				1762															
13-Oct-09	11	500	440	7.64	2282	#N/A	9.1	69.2	1676	<0.5	1580	0.011	0.542	0.0439	0.009	<0.00005	<0.00003	<0.3	0.0312	591	<0.0005	0.00188	0.0154	0.008
20-Oct-09	12	500	440	7.58	2204				1601															
27-Oct-09	13	500	450	7.64	2310	#N/A	8.5	58.8	1676	<0.5	1560	0.005	0.61	0.0392	0.0079	<0.00005	<0.00003	<0.3	0.029	580	<0.0005	0.00187	0.0091	0.018
03-Nov-09	14	500	400	7.60	2275				1575															
10-Nov-09	15	500	465	7.43	2180	#N/A	12.0	56.5	1529	<0.5	1560	0.016	0.608	0.0339	0.0096	<0.00005	<0.00003	<0.3	0.0296	590	<0.0005	0.00146	0.0115	0.033
17-Nov-09	16	500	505	7.54	2262				1593															
24-Nov-09	17	500	485	7.73	2216	#N/A	10.5	68.0	1649	<0.5	1500	0.002	0.546	0.0309	0.0099	<0.00005	<0.00003	<0.3	0.0384	575	<0.0005	0.00103	0.0166	0.01
01-Dec-09	18	500	475	7.66	2078				1538															
08-Dec-09	19	500	465	7.50	1823	#N/A	9.6	62.7	1163	<0.5	1140	0.003	0.489	0.0272	0.0069	<0.00005	<0.00003	<0.3	0.0279	434	<0.0005	0.001	0.0115	0.013
15-Dec-09	20	500	490	7.69	1570				1086															
22-Dec-09	21	500	455	7.65	1159	#N/A	6.3	54.9	836	<0.5	771	0.003	0.495	0.0249	0.0065	<0.00005	<0.00003	<0.3	0.0203	290	<0.0005	0.00083	0.0095	0.014
29-Dec-09	22	500	440	7.65	1289				755															
05-Jan-10	23	500	440	7.55	1157	#N/A	8.0	64.2	621	<0.5	662	0.002	0.516	0.0269	0.0077	<0.00005	<0.00003	<0.3	0.0163	242	<0.0005	0.00088	0.0099	0.006
12-Jan-10	24	500	430	7.63	1033				590															
19-Jan-10	25	500	450	7.76	915	#N/A	7.8	73.3	457	<0.5	500	0.006	0.48	0.0287	0.0105	<0.00005	<0.00003	<0.3	0.0112	178	<0.0005	0.00068	0.0125	0.009
26-Jan-10	26	500	410	7.66	727				390															
02-Feb-10	27	500	455	7.69	619	#N/A	5.5	80.3	352	<0.5	409	0.003	0.41	0.0303	0.0118	<0.00005	<0.00003	<0.3	0.00895	143	<0.0005	0.00043	0.0829	0.133
09-Feb-10	28	500	440	7.72	693				341															
16-Feb-10	29	500	455	7.75	592	#N/A	6.1	89.8	262	<0.5	362	0.0033	0.424	0.0334	0.0139	<0.00001	<0.000005	<0.05	0.0073	124	<0.0001	0.000877	0.00566	0.003
23-Feb-10	30	500	420	7.87	606				243															
02-Mar-10	31	500	405	7.89	546	#N/A	3.5	81.4	233	<0.5	315	0.007	0.395	0.0341	0.0173	<0.00005	<0.00003	<0.3	0.00654	103	<0.0005	0.0007	0.0056	<0.005
09-Mar-10	32	500	375	7.82	457				159															
16-Mar-10	33	500	455	7.80	425	#N/A	4.7	89.1	149	<0.5	218	0.003	0.382	0.0384	0.0162	<0.00005	<0.00003	<0.3	0.0043	68.3	<0.0005	0.00077	0.0052	<0.005
23-Mar-10	34	500	455	7.80	458				185															
30-Mar-10	35	500	415	7.82	428	#N/A	4.1	81.7	161	<0.5	225	0.005	0.397	0.0363	0.0172	<0.00005	<0.00003	<0.3	0.00437	69.2	<0.0005	0.00085	0.0042	0.006
06-Apr-10	36	500	455	7.80	393				139															
13-Apr-10	37	500	450	7.76	431	#N/A	6.0	94.3	155	<0.5	226	0.004	0.436	0.0404	0.0213	<0.00005	<0.00003	<0.3	0.00414	67.2	<0.0005	0.00079	0.0046	<0.005
20-Apr-10	38	500	470	7.91	443	#N/A	4.4	96.5	141	<0.5	215	0.004	0.447	0.0404	0.0329	<0.00005	<0.00003	<0.3	0.00434	62.6	<0.0005	0.00084	0.0061	<0.005
27-Apr-10	39	500	390	7.91	391	#N/A	2.6	89.7	124	<0.5	199	0.004	0.411	0.0432	0.0216	<0.00005	<0.00003	<0.3	0.00352	57.7	<0.0005	0.0007	0.0053	<0.005
04-May-10	40	500	425	7.88	430				143															
11-May-10	41	500	445	7.86	395	#N/A	4.1	84.5	128	<0.5	192	0.006	0.428	0.0421	0.0223	<0.00005	<0.00003	<0.3	0.00368	55.8	<0.0005	0.00058	0.0041	<0.005
18-May-10	42	500	420	7.83	403				129															
25-May-10	43	500	450	7.72	421	#N/A	6.0	88.9	127	<0.5	230	0.0033	0.388	0.0491	0.0233	<0.00001	0.000023	<0.05	0.00357	66.2	0.0001	0.000692	0.00606	0.003
01-Jun-10	44	500	465	7.91	416				120															
08-Jun-10	45	500	465	7.84	415	#N/A	5.0	93.6	119	<0.5	226	0.0032	0.362	0.0497	0.0239	<0.00001	<0.000005	<0.05	0.00332	64.3	<0.0001	0.000646	0.00354	0.002
15-Jun-10	46	500	410	7.86	343				84															
22-Jun-10	47	500	435	8.01	364	#N/A	2.9	87.3	92	<0.5	193	0.0067	0.361	0.0517	0.0244	<0.00001	<0.000005	<0.05	0.00315	53.8	0.0001	0.000509	0.004	0.003
29-Jun-10	48	500	440	7.78	368				125															
06-Jul-10	49	500	460	8.03	371	#N/A	2.9	94.1	117	<0.5	211	0.0031	0.343	0.0489	0.026	<0.00001	<0.000005	<0.05	0.0039	58.3	<0.0001	0.000422	0.00472	0.004
13-Jul-10	50	500	415	7.83	291				71															
20-Jul-10	51	500	495	7.89	353	#N/A	5.0	87.6	87	<0.5	188	0.0041	0.27	0.0441	0.0234	<0.00001	<0.000005	<0.05	0.00352	52.5	<0.0001	0.000413	0.00329	0.005
27-Jul-10	52	500	460	7.72	366				116															
03-Aug-10	53	500	435	7.91	332	#N/A	4.3	79.0	115	<0.5	175	0.0059	0.271	0.0477	0.0222	<0.00001	<0.000005	<0.05	0.00334	47.9	<0.0001	0.000338	0.00331	0.002

Appendix A-2

Humidity Cell T2 (Sand-Silt Composite)

Results of Leachate Analysis

Date	Cycle No.	Volume mL		pH	Cond. umhos/cm	Acidity (pH 4.5) mg CaCO ₃ /L	Acidity (pH 8.3) mg CaCO ₃ /L	Alkalinity mg CaCO ₃ /L	Sulphate mg/L	Chloride mg/L	Hardness mg CaCO ₃ /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
10-Aug-10	54	500	450	7.86	314				125															
17-Aug-10	55	500	435	7.70	134	#N/A	3.4	29.1	29	0.7	61.3	0.0205	0.137	0.0341	0.00992	<0.00001	0.000034	<0.05	0.00188	15.9	<0.0001	0.000094	0.00313	0.026
24-Aug-10	56	500	435	7.55	590				183															
31-Aug-10	57	500	430	7.79	363	#N/A	8.0	65.0	177	3.2	199	0.0066	0.255	0.0537	0.0209	<0.00001	<0.000005	<0.05	0.00292	53.2	<0.0001	0.000507	0.0027	0.002
07-Sep-10	58	500	430	7.73	341				135															
14-Sep-10	59	500	395	7.72	249	#N/A	3.9	67.2	83	5.8	140	0.0077	0.246	0.0594	0.0151	<0.00001	0.000008	<0.05	0.0018	37.7	<0.0001	0.000405	0.00346	0.004
21-Sep-10	60	500	485	7.96	266				69															
28-Sep-10	61	500	420	7.88	297	#N/A	3.5	91.4	71	6.6	149	0.0062	0.276	0.0651	0.0231	<0.00001	<0.000005	<0.05	0.00225	40	0.0001	0.00042	0.00304	0.002
05-Oct-10	62	500	475	7.55	204																			
12-Oct-10	63	500	445	7.47	171				53															
19-Oct-10	64	500	460	7.39	418																			
26-Oct-10	65	500	435	7.59	593	#N/A	3.9	53.1	215	#N/A	337	<0.05	0.2	0.06	0.032	<0.003	<0.05	<0.01	<0.005	89.2	<0.01	<0.02	<0.02	<0.01
02-Nov-10	66	500	450	7.87	410																			
09-Nov-10	67	500	460	7.75	603				210															
16-Nov-10	68	500	425	7.96	267																			
23-Nov-10	69	500	460	7.64	421	#N/A	4.7	87.3	166	#N/A	223	<0.05	0.21	0.06	0.024	<0.003	<0.05	<0.01	<0.005	58.7	<0.01	<0.02	<0.02	<0.01
30-Nov-10	70	500	445	7.65	416																			
07-Dec-10	71	500	430	7.67	417				190															
14-Dec-10	72	500	435	7.58	471																			
21-Dec-10	73	500	445	7.51	406	#N/A	7.3	66.3	162	#N/A	208	<0.05	0.18	0.05	0.021	<0.003	<0.05	<0.01	<0.005	53.3	<0.01	<0.02	<0.02	0.08
28-Dec-10	74	500	425	7.61	334																			
04-Jan-11	75	500	495	7.71	380				120															
11-Jan-11	76	500	445	7.67	357																			
18-Jan-11	77	500	450	7.70	400	#N/A	5.6	88.5	120	#N/A	207	<0.05	0.17	0.06	0.025	<0.003	<0.05	<0.01	<0.005	53.6	<0.01	<0.02	<0.02	<0.01
25-Jan-11	78	500	420	7.66	415																			
01-Feb-11	79	500	460	7.66	382				136															
08-Feb-11	80	500	390	7.77	355																			
15-Feb-11	81	500	435	7.75	361	#N/A	4.7	84.3	88	#N/A	190	<0.05	0.17	0.06	0.021	<0.003	<0.05	<0.01	<0.005	48.7	<0.01	<0.02	<0.02	<0.01
22-Feb-11	82	500	440	7.84	360																			
01-Mar-11	83	500	445	7.75	358				135															
08-Mar-11	84	500	425	7.74	336																			
15-Mar-11	85	500	425	7.76	394	#N/A	4.2	75.0	150	#N/A	204	<0.05	0.13	0.05	0.024	<0.003	<0.05	<0.01	<0.005	52.4	<0.01	<0.02	<0.02	<0.01
22-Mar-11	86	500	415	7.77	372																			
29-Mar-11	87	500	440	7.74	153				40															
05-Apr-11	88	500	435	7.40	300																			
12-Apr-11	89	500	435	7.31	159	#N/A	3.1	23.6	49	#N/A	72	<0.05	0.09	0.03	0.008	<0.003	<0.05	<0.01	<0.005	18.4	<0.01	<0.02	<0.02	<0.01
19-Apr-11	90	500	415	7.54	190																			
26-Apr-11	91	500	410	7.68	571				199															
03-May-11	92	500	460	7.74	418																			
10-May-11	93	500	455	7.76	377	#N/A	4.8	80.7	125	#N/A	188	<0.05	0.13	0.07	0.02	<0.003	<0.05	<0.01	<0.005	48	<0.01	<0.02	<0.02	<0.01
17-May-11	94	500	455	7.63	278																			
24-May-11	95	500	430	7.43	167				54															
31-May-11	96	500	465	7.30	317																			
07-Jun-11	97	500	465	7.77	539	#N/A	5.3	82.4	239	#N/A	287	<0.05	0.14	0.07	0.03	<0.003	<0.05	<0.01	<0.005	72.9	<0.01	<0.02	<0.02	<0.01
14-Jun-11	98	500	420	7.71	422																			

Notes: Values in red are below the detection limit. For calculation purposes, values below detection were set at half the value of the analytical limit.

Appendix A-2

Humidity Cell T2 (Sand-Silt Composite)

Results of Leachate Analysis

Date	Cycle No.	Volume mL		Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl	Sn	Ti	U	V	Zn	Zr
		Input	Output	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
28-Jul-09	0	750	440	0.00169	0.0047	23.2	4.41	0.06	0.00392	0.00253	0.013	10.6	0.00037	1.49	0.000854	6.07	0.455	319	0.000483	0.00924	<0.0005	0.000055	<0.0002	0.109	<0.0001
04-Aug-09	1	500	400	0.00347	0.014	63	9.64	<0.05	0.0151	0.0062	<0.01	19.8	0.0007	6.85	<0.00003	14.8	0.958	569	0.00061	0.00543	<0.003	0.0002	<0.001	0.177	<0.0005
11-Aug-09	2	500	400	0.00379	0.016	61.8	13.4	<0.05	0.0144	0.0059	<0.01	18.3	0.0006	7.94	0.00004	9.79	0.985	607	0.00047	0.00532	<0.003	0.00016	<0.001	0.355	<0.0005
18-Aug-09	3	500	440	0.00436	0.015	40.1	14.5	<0.05	0.0121	0.0068	<0.01	12.9	0.0002	6.29	<0.00003	4.29	0.934	567	0.00031	0.00482	<0.003	0.00014	<0.001	0.533	<0.0005
25-Aug-09	4	500	430																						
01-Sep-09	5	500	400	0.00518	0.014	27.2	16.1	<0.1	0.0112	0.0067	<0.02	8.98	<0.0004	7.56	<0.00005	1.84	0.872	493	0.00016	0.0059	<0.005	0.00015	<0.002	0.827	<0.001
08-Sep-09	6	500	440																						
15-Sep-09	7	500	465	0.00714	0.014	16.3	16.8	<0.05	0.008	0.0126	<0.01	7.23	0.0008	9.98	<0.00003	1.06	0.775	523	0.00013	0.0128	<0.003	0.00028	<0.001	1.57	<0.0005
22-Sep-09	8	500	455																						
29-Sep-09	9	500	460	0.00627	0.01	22.8	4.42	<0.05	0.005	0.0141	<0.01	5.82	0.001	8.07	<0.00003	0.65	0.612	550	0.0001	0.0148	<0.003	0.00052	<0.001	1.77	<0.0005
06-Oct-09	10	500	410																						
13-Oct-09	11	500	440	0.00626	0.009	25.1	1.06	<0.05	0.003	0.0083	<0.01	4.64	<0.0002	6.89	<0.00003	0.42	0.562	541	0.00006	0.0113	<0.003	0.00076	<0.001	2.68	<0.0005
20-Oct-09	12	500	440																						
27-Oct-09	13	500	450	0.00506	0.007	25.9	0.365	<0.05	0.003	0.0057	<0.01	3.82	<0.0002	7.13	0.00004	0.31	0.545	526	0.00009	0.0106	<0.003	0.00065	<0.001	2.35	<0.0005
03-Nov-09	14	500	400																						
10-Nov-09	15	500	465	0.0051	0.006	22	0.215	<0.05	0.0028	0.0036	<0.01	3.38	0.0003	5.74	0.00005	0.32	0.495	499	0.00009	0.0087	<0.003	0.0008	<0.001	2.55	<0.0005
17-Nov-09	16	500	505																						
24-Nov-09	17	500	485	0.00563	0.005	16.2	0.598	<0.05	0.0029	0.0049	<0.01	2.68	<0.0002	5.8	<0.00003	0.28	0.455	503	0.00009	0.0101	<0.003	0.00079	<0.001	3.8	<0.0005
01-Dec-09	18	500	475																						
08-Dec-09	19	500	465	0.00435	0.004	13.6	0.287	<0.05	0.0026	0.0037	<0.01	1.84	<0.0002	4.81	0.00005	0.19	0.332	368	0.00008	0.00812	0.003	0.00062	<0.001	2.94	<0.0005
15-Dec-09	20	500	490																						
22-Dec-09	21	500	455	0.00312	0.003	11.7	0.206	<0.05	0.0024	0.0034	<0.01	1.48	<0.0002	4.37	<0.00003	0.31	0.241	253	0.00006	0.00767	<0.003	0.00042	<0.001	2.03	<0.0005
29-Dec-09	22	500	440																						
05-Jan-10	23	500	440	0.00268	0.003	13.9	0.121	<0.05	0.0025	0.0015	<0.01	1.32	<0.0002	4.79	<0.00003	0.15	0.203	222	0.00004	0.00987	<0.003	0.00041	<0.001	1.54	<0.0005
12-Jan-10	24	500	430																						
19-Jan-10	25	500	450	0.00222	<0.003	13.5	0.078	<0.05	0.0027	0.0027	<0.01	1.23	<0.0002	4.77	<0.00003	0.2	0.156	156	0.00006	0.00865	<0.003	0.00034	<0.001	1.1	<0.0005
26-Jan-10	26	500	410																						
02-Feb-10	27	500	455	0.00205	<0.003	13	0.0547	<0.05	0.0027	0.0773	<0.01	1.13	<0.0002	4.83	0.00014	0.17	0.133	124	0.00006	0.00881	<0.003	0.00034	<0.001	0.819	<0.0005
09-Feb-10	28	500	440																						
16-Feb-10	29	500	455	0.00204	0.0024	13.1	0.0652	<0.01	0.00333	0.00082	0.002	1.13	0.00009	4.6	0.00001	0.2	0.131	96	0.000054	0.015	<0.0005	0.00031	<0.0002	0.657	<0.0001
23-Feb-10	30	500	420																						
02-Mar-10	31	500	405	0.00182	<0.003	14.4	0.0424	<0.05	0.0036	0.0007	<0.01	1.02	<0.0002	4.23	<0.00003	0.16	0.116	67	0.00006	0.00906	<0.003	0.00029	<0.001	0.634	<0.0005
09-Mar-10	32	500	375																						
16-Mar-10	33	500	455	0.00157	<0.003	11.5	0.0218	<0.05	0.0033	0.0006	<0.01	0.8	<0.0002	3.94	<0.00003	<0.3	0.085	52	0.00006	0.00856	<0.003	0.00027	<0.001	0.358	<0.0005
23-Mar-10	34	500	455																						
30-Mar-10	35	500	415	0.0019	<0.003	12.8	0.0295	<0.05	0.004	0.0006	<0.01	0.82	<0.0002	3.08	<0.00003	0.21	0.0873	54	0.00005	0.00994	<0.003	0.00038	<0.001	0.425	<0.0005
06-Apr-10	36	500	455																						
13-Apr-10	37	500	450	0.00149	<0.003	14.1	0.0273	<0.05	0.0037	0.0006	<0.01	0.8	<0.0002	4.62	<0.00003	<0.3	0.0918	<50	0.00005	0.00849	<0.003	0.00025	<0.001	0.407	<0.0005
20-Apr-10	38	500	470	0.00152	<0.003	14.1	0.0289	<0.05	0.0039	0.0005	<0.01	0.8	<0.0002	3.94	0.00004	<0.3	0.0939	<50	0.00007	0.00997	<0.003	0.00024	<0.001	0.379	<0.0005
27-Apr-10	39	500	390	0.00119	<0.003	13.3	0.0195	0.09	0.0037	0.0004	<0.01	0.8	0.0003	4.14	0.00006	<0.3	0.0829	<50	0.00008	0.0069	<0.003	0.0002	<0.001	0.288	<0.0005
04-May-10	40	500	425																						
11-May-10	41	500	445	0.00142	<0.003	12.8	0.0201	<0.05	0.0036	0.0004	<0.01	0.8	<0.0002	4.26	<0.00003	<0.3	0.0841	<							

Appendix A-2

Humidity Cell T2 (Sand-Silt Composite)

Results of Leachate Analysis

Date	Cycle No.	Volume mL		Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl	Sn	Ti	U	V	Zn	Zr
		Input	Output	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
10-Aug-10	54	500	450																						
17-Aug-10	55	500	435	0.00301	<0.0005	5.22	0.0513	<0.01	0.0009	0.00028	0.002	0.22	<0.00004	1.38	0.000025	0.21	0.0281	14	0.000012	0.0008	<0.0005	0.000028	<0.0002	0.202	<0.0001
24-Aug-10	56	500	435																						
31-Aug-10	57	500	430	0.000529	0.0012	16	0.0486	0.01	0.00313	0.00038	0.004	0.64	0.00007	2.77	0.000035	0.14	0.084	49	0.000063	0.00032	<0.0005	0.00019	<0.0002	0.188	<0.0001
07-Sep-10	58	500	430																						
14-Sep-10	59	500	395	0.000534	0.001	11.1	0.0143	<0.01	0.00328	0.00024	<0.002	0.52	0.00007	2.49	0.000086	0.14	0.058	25	0.000043	0.00014	<0.0005	0.000134	<0.0002	0.104	<0.0001
21-Sep-10	60	500	485																						
28-Sep-10	61	500	420	0.00074	0.0012	11.9	0.019	<0.01	0.00365	0.00051	<0.002	0.6	0.00009	2.87	0.000069	0.13	0.0662	24	0.000064	0.00018	<0.0005	0.000214	<0.0002	0.139	<0.0001
05-Oct-10	62	500	475																						
12-Oct-10	63	500	445																						
19-Oct-10	64	500	460																						
26-Oct-10	65	500	435	<0.03	#N/A	27.7	0.026	#N/A	<0.02	<0.02	<0.05	0.7	<0.1	2.45	<0.01	0.2	0.138	91.8	#N/A	<0.03	<0.005	#N/A	<0.01	0.186	<0.02
02-Nov-10	66	500	450																						
09-Nov-10	67	500	460																						
16-Nov-10	68	500	425																						
23-Nov-10	69	500	460	<0.03	#N/A	18.6	0.029	#N/A	<0.02	<0.02	<0.05	0.5	<0.1	2.57	<0.01	<0.1	0.098	49.9	#N/A	<0.03	<0.005	#N/A	<0.01	0.229	<0.02
30-Nov-10	70	500	445																						
07-Dec-10	71	500	430																						
14-Dec-10	72	500	435																						
21-Dec-10	73	500	445	<0.03	#N/A	18.3	0.02	#N/A	<0.02	<0.02	<0.05	0.6	<0.1	2.12	<0.01	0.3	0.095	48.6	#N/A	<0.03	<0.005	#N/A	<0.01	0.229	<0.02
28-Dec-10	74	500	425																						
04-Jan-11	75	500	495																						
11-Jan-11	76	500	445																						
18-Jan-11	77	500	450	<0.03	#N/A	17.7	0.034	#N/A	<0.02	<0.02	<0.05	0.5	<0.1	2.78	<0.01	0.2	0.095	40.1	#N/A	<0.03	<0.005	#N/A	<0.01	0.189	<0.02
25-Jan-11	78	500	420																						
01-Feb-11	79	500	460																						
08-Feb-11	80	500	390																						
15-Feb-11	81	500	435	<0.03	#N/A	16.5	0.034	#N/A	<0.02	<0.02	<0.05	0.5	<0.1	2.63	<0.01	<0.1	0.088	36.9	#N/A	<0.03	<0.005	#N/A	<0.01	0.136	<0.02
22-Feb-11	82	500	440																						
01-Mar-11	83	500	445																						
08-Mar-11	84	500	425																						
15-Mar-11	85	500	425	<0.03	#N/A	17.7	0.026	#N/A	<0.02	<0.02	<0.05	0.4	<0.1	2.61	<0.01	<0.1	0.094	42.3	#N/A	<0.03	<0.005	#N/A	<0.01	0.116	<0.02
22-Mar-11	86	500	415																						
29-Mar-11	87	500	440																						
05-Apr-11	88	500	435																						
12-Apr-11	89	500	435	<0.03	#N/A	6.31	0.021	#N/A	<0.02	<0.02	<0.05	<0.3	<0.1	0.94	<0.01	<0.1	0.034	17.8	#N/A	<0.03	<0.005	#N/A	<0.01	0.08	<0.02
19-Apr-11	90	500	415																						
26-Apr-11	91	500	410																						
03-May-11	92	500	460																						
10-May-11	93	500	455	<0.03	#N/A	16.6	0.023	#N/A	<0.02	<0.02	<0.05	0.4	<0.1	2.6	<0.01	0.1	0.087	39.2	#N/A	<0.03	<0.005	#N/A	<0.01	0.122	<0.02
17-May-11	94	500	455																						
24-May-11	95	500	430																						
31-May-11	96	500	465																						
07-Jun-11	97	500	465	<0.03	#N/A	25.4	0.044	#N/A	<0.02	<0.02	<0.05	0.4	<0.1	3.15	<0.01	0.3	0.136	67.7	#N/A	<0.03	<0.005	#N/A	<0.01	0.176	<0.02
14-Jun-11	98	500	420																						

Notes: Values in red are below the detection limit. For calculation purposes, values below detection were set at half the value of the analytical limit.

Appendix A-2 Humidity Cell T3 (Silt-Clay Composite) Results of Leachate Analysis																								
Date	Cycle No.	Volume mL		pH	Cond.	Acidity	Acidity	Alkalinity	Sulphate	Chloride	Hardness	Al	Sb	As	Ba	Be	Bi	B	Cd	Ca	Cr	Co	Cu	Fe
		Input	Output		umhos/cm	(pH 4.5) mg CaCO ₃ /L	(pH 8.3) mg CaCO ₃ /L	mg CaCO ₃ /L	mg/L	mg/L	ng CaCO ₃ /l	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
28-Jul-09	0	750	380	7.70	2790	#N/A	11.8	60.2	1685	68	1580	<0.01	0.257	0.266	0.031	<0.0005	<0.0003	<3	0.0055	539	<0.005	0.0186	0.062	0.352
04-Aug-09	1	500	435	7.59	2522	#N/A	8.4	45.6	1698	3.1	1630	0.01	0.52	0.308	0.0107	<0.00005	<0.00003	<0.3	0.00354	571	<0.0005	0.0199	0.0144	0.045
11-Aug-09	2	500	445	7.74	2374	#N/A	9.7	52.9	1667	0.9	1600	0.008	1.3	0.262	0.0088	<0.00005	<0.00003	<0.3	0.00602	568	<0.0005	0.0141	0.0165	0.053
18-Aug-09	3	500	470	7.75	2227	#N/A	8.5	71.0	1445	0.8	1670	0.006	1.47	0.214	0.0099	<0.00005	<0.00003	<0.3	0.00859	607	<0.0005	0.0146	0.0151	0.048
25-Aug-09	4	500	460	7.92	2139				1441															
01-Sep-09	5	500	420	7.87	2288	#N/A	10.8	68.5	1507	0.7	1740	0.011	1.25	0.176	0.0114	<0.0001	<0.00005	<0.5	0.00968	648	<0.001	0.0136	0.0234	0.026
08-Sep-09	6	500	435	7.70	2221				1751															
15-Sep-09	7	500	455	7.89	2209	#N/A	10.7	76.3	1508	<0.5	1550	0.004	1.11	0.169	0.0108	<0.00005	<0.00003	<0.3	0.0118	590	<0.0005	0.0122	0.0125	0.007
22-Sep-09	8	500	465	7.87	2132				1500															
29-Sep-09	9	500	395	7.82	2158	#N/A	8.0	65.6	1824	<0.5	1610	0.005	0.867	0.158	0.0098	<0.00005	<0.00003	<0.3	0.00943	621	<0.0005	0.00861	0.0111	0.037
06-Oct-09	10	500	400	7.77	2270				1703															
13-Oct-09	11	500	430	7.93	2262	#N/A	5.6	71.3	1676	<0.5	1540	0.005	0.691	0.136	0.0092	<0.00005	<0.00003	<0.3	0.00796	594	<0.0005	0.00526	0.0082	0.007
20-Oct-09	12	500	465	7.83	2173				1642															
27-Oct-09	13	500	480	7.93	2220	#N/A	6.6	81.8	1398	<0.5	1490	0.005	0.754	0.129	0.009	<0.00005	<0.00003	<0.3	0.0107	577	<0.0005	0.00343	0.0074	0.015
03-Nov-09	14	500	405	7.84	2222				1567															
10-Nov-09	15	500	460	7.65	2138	#N/A	11.2	70.5	1574	0.8	1520	0.009	0.684	0.106	0.0104	<0.00005	<0.00003	<0.3	0.0103	590	<0.0005	0.003	0.0061	0.034
17-Nov-09	16	500	490	7.91	2151				1489															
24-Nov-09	17	500	505	8.01	1763	#N/A	6.2	84.4	1197	<0.5	1100	0.005	0.649	0.105	0.0094	<0.00005	<0.00003	<0.3	0.0098	431	<0.0005	0.00214	0.0055	0.008
01-Dec-09	18	500	470	7.98	1075				643															
08-Dec-09	19	500	455	7.92	1088	#N/A	6.1	73.1	435	<0.5	625	0.006	0.612	0.097	0.0084	<0.00005	<0.00003	<0.3	0.00459	242	<0.0005	0.00157	0.0041	0.008
15-Dec-09	20	500	465	8.10	983				609															
22-Dec-09	21	500	445	8.01	732	#N/A	3.4	75.2	394	<0.5	441	0.007	0.668	0.101	0.0101	<0.00005	<0.00003	<0.3	0.00322	170	<0.0005	0.00128	0.0036	0.009
29-Dec-09	22	500	435	7.99	777				348															
05-Jan-10	23	500	430	7.84	685	#N/A	5.6	82.1	299	<0.5	348	0.006	0.755	0.106	0.0124	<0.00005	<0.00003	<0.3	0.0024	133	<0.0005	0.00102	0.0071	0.006
12-Jan-10	24	500	405	7.97	646				271															
19-Jan-10	25	500	425	8.03	598	#N/A	5.8	90.3	250	<0.5	290	0.006	0.742	0.105	0.0156	<0.0001	<0.00005	<0.5	0.00206	110	<0.001	0.00075	0.0102	<0.01
26-Jan-10	26	500	445	7.96	414				146															
02-Feb-10	27	500	485	7.88	354	#N/A	4.1	90.0	133	<0.5	220	0.006	0.655	0.109	0.0174	<0.00005	<0.00003	<0.3	0.00158	82.3	<0.0005	0.00048	0.0031	0.011
09-Feb-10	28	500	415	7.97	428				122															
16-Feb-10	29	500	460	8.00	387	#N/A	3.8	102.4	122	<0.5	216	0.007	0.704	0.109	0.0232	<0.00005	<0.00003	<0.3	0.00181	80	<0.0005	0.00045	0.0037	0.005
23-Feb-10	30	500	490	8.04	352				88															
02-Mar-10	31	500	440	8.02	338	#N/A	3.3	101.6	89	<0.5	177	0.007	0.651	0.11	0.0422	<0.00005	<0.00003	<0.3	0.00148	65	<0.0005	0.00063	0.0031	<0.005
09-Mar-10	32	500	415	7.97	309				66															
16-Mar-10	33	500	490	8.12	352	#N/A	2.4	109.7	82	<0.5	159	0.007	0.624	0.117	0.028	<0.00005	<0.00003	<0.3	0.00154	57.8	<0.0005	0.00038	0.006	<0.005
23-Mar-10	34	500	440	8.01	315				92															
30-Mar-10	35	500	420	7.98	299	#N/A	2.6	84.5	96	<0.5	154	0.006	0.668	0.121	0.0255	<0.00005	<0.00003	<0.3	0.00116	56	<0.0005	0.00054	0.004	<0.005
06-Apr-10	36	500	395	7.88	285				90															
13-Apr-10	37	500	415	7.85	287	#N/A	4.0	72.3	78	<0.5	143	0.01	0.712	0.138	0.025	<0.00005	<0.00003	<0.3	0.00111	51.5	<0.0005	0.00059	0.0024	0.006
20-Apr-10	38	500	445	8.09	330	#N/A	3.1	102.9	71	<0.5	157	0.007	0.691	0.122	0.0359	<0.00005	<0.00003	<0.3	0.00174	56.1	<0.0005	0.00043	0.0036	<0.005
27-Apr-10	39	500	500	8.01	284	#N/A	2.5	101.1	55	<0.5	144	0.006	0.579	0.128	0.0323	<0.00005	<0.00003	<0.3	0.00192	51.2	<0.0005	0.0003	0.0036	<0.005
04-May-10	40	500	485	7.99	301				69															
11-May-10	41	500	450	7.99	325	#N/A	4.1	120.2	63	<0.5	160	0.007	0.63	0.107	0.0407	<0.00005	<0.00003	<0.3	0.00246	57	<0.0005	0.00034	0.0041	<0.005
18-May-10	42	500	505	7.92	289				34															
25-May-10	43	500	410	7.84	160	#N/A	4.3	61.1	16	<0.5	78.3	0.0183	0.365	0.15	0.0172	<0.00001	<0.000005	<0.05	0.000464	28.2	0.0004	0.000312	0.00181	0.007
01-Jun-10	44	500	390	7.78	240				51															
08-Jun-10	45	500	415	7.81	283	#N/A	3.6	61.2	68	<0.5	143	0.0113	0.471	0.144	0.0319	<0.00001	<0.000005	<0.05	0.000994	51.1	0.0002	0.000695	0.0045	0.004
15-Jun-10	46	500	455	7.91	289				63															
22-Jun-10	47	500	415	8.04	322	#N/A	2.4	74.1	86	<0.5	159	0.0077	0.553	0.143	0.0358	<0.00001	<0.000005	<0.05	0.00127	55.8	<0.0001	0.000638	0.00318	0.003
29-Jun-10	48	500	470	7.90	401				141															

Appendix A-2
Humidity Cell T3 (Silt-Clay Composite)
Results of Leachate Analysis

Date	Cycle No.	Volume mL		pH	Cond. umhos/cm	Acidity (pH 4.5)	Acidity (pH 8.3)	Alkalinity mg CaCO ₃ /L	Sulphate mg/L	Chloride mg/L	Hardness ng CaCO ₃ /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
		Input	Output			mg CaCO ₃ /L	mg CaCO ₃ /L																	
06-Jul-10	49	500	420	7.85	393	#N/A	3.6	73.9	111	<0.5	222	0.0063	0.487	0.115	0.0408	<0.00001	<0.000005	<0.05	0.00164	79.4	0.0003	0.000635	0.00264	0.006
13-Jul-10	50	500	440	7.89	380				88															
20-Jul-10	51	500	460	7.91	391	#N/A	4.6	87.5	116	<0.5	213	0.005	0.419	0.114	0.0418	<0.00001	<0.000005	<0.05	0.00191	75.6	<0.0001	0.000613	0.00237	0.004
27-Jul-10	52	500	475	7.80	382				122															
03-Aug-10	53	500	455	8.01	408	#N/A	4.1	87.5	115	<0.5	210	0.008	0.442	0.124	0.0415	<0.00001	<0.000005	<0.05	0.00206	74.2	0.0001	0.000628	0.00254	0.007
10-Aug-10	54	500	440	7.97	366				150															
17-Aug-10	55	500	435	7.98	356	#N/A	3.7	76.7	119	<0.5	184	0.0081	0.457	0.124	0.0346	<0.00001	<0.000005	<0.05	0.0017	64.7	<0.0001	0.000538	0.00529	0.009
24-Aug-10	56	500	430	7.95	346				95															
31-Aug-10	57	500	445	8.01	322	#N/A	7.3	88.1	119	<0.5	173	0.0085	0.46	0.133	0.0352	<0.00001	<0.000005	<0.05	0.00138	60.4	<0.0001	0.000463	0.00219	0.005
07-Sep-10	58	500	420	7.75	334				119															
14-Sep-10	59	500	395	7.83	294	#N/A	4.3	82.6	110	<0.5	167	0.0193	0.414	0.129	0.0307	<0.00001	0.00002	<0.05	0.0014	58.4	0.0001	0.000506	0.00487	0.003
21-Sep-10	60	500	500	7.94	284				136															
28-Sep-10	61	500	290	7.83	288	#N/A	4.4	91.1	130	0.8	185	0.0072	0.431	0.138	0.0363	<0.00001	<0.000005	<0.05	0.00156	64.6	<0.0001	0.000648	0.00233	0.002
05-Oct-10	62	500	480	7.82	336																			
12-Oct-10	63	500	390	7.92	355				159															
19-Oct-10	64	500	455	7.80	344																			
26-Oct-10	65	500	405	7.83	321	#N/A	3.3	71.9	131	#N/A	175	<0.05	0.37	0.14	0.031	<0.003	<0.05	<0.01	<0.005	60.7	<0.01	<0.02	<0.02	<0.01
02-Nov-10	66	500	460	8.05	341																			
09-Nov-10	67	500	430	7.86	319				153															
16-Nov-10	68	500	400	8.02	347																			
23-Nov-10	69	500	410	7.74	354	#N/A	4.4	79.2	129	#N/A	181	<0.05	0.36	0.14	0.033	<0.003	<0.05	<0.01	<0.005	62.5	<0.01	<0.02	<0.02	<0.01
30-Nov-10	70	500	415	7.76	352																			
07-Dec-10	71	500	435	7.79	370				144															
14-Dec-10	72	500	435	7.71	411																			
21-Dec-10	73	500	445	7.53	666	#N/A	7.9	60.2	126	#N/A	196	<0.05	0.31	0.12	0.04	<0.003	<0.05	<0.01	<0.005	66.8	<0.01	<0.02	<0.02	<0.01
28-Dec-10	74	500	395	7.77	349																			
04-Jan-11	75	500	495	7.84	317				86															
11-Jan-11	76	500	410	7.76	284																			
18-Jan-11	77	500	420	7.80	340	#N/A	5.2	88.1	82	#N/A	172	<0.05	0.3	0.13	0.034	<0.003	<0.05	<0.01	<0.005	59.2	<0.01	<0.02	<0.02	<0.01
25-Jan-11	78	500	445	7.77	357																			
01-Feb-11	79	500	455	7.79	354				101															
08-Feb-11	80	500	440	7.89	334																			
15-Feb-11	81	500	450	7.80	335	#N/A	4.4	90.5	79	#N/A	175	<0.05	0.27	0.13	0.035	<0.003	<0.05	<0.01	<0.005	60.2	<0.01	<0.02	<0.02	<0.01
22-Feb-11	82	500	460	7.90	342																			
01-Mar-11	83	500	460	7.85	362				116															
08-Mar-11	84	500	430	7.87	352																			
15-Mar-11	85	500	435	7.85	329	#N/A	3.6	80.5	83	#N/A	167	<0.05	0.24	0.13	0.032	<0.003	<0.05	<0.01	<0.005	57.2	<0.01	<0.02	<0.02	<0.01
22-Mar-11	86	500	445	7.86	332																			
29-Mar-11	87	500	485	7.73	323				82															
05-Apr-11	88	500	445	7.71	350																			
12-Apr-11	89	500	340	7.68	267	#N/A	4.3	64.2	68	#N/A	129	<0.05	0.28	0.14	0.024	<0.003	<0.05	<0.01	<0.005	44.3	<0.01	<0.02	<0.02	<0.01
19-Apr-11	90	500	450	7.72	287																			
26-Apr-11	91	500	395	7.78	302				78															
03-May-11	92	500	460	7.83	320																			
10-May-11	93	500	480	7.86	309	#N/A	5.1	90.9	84	#N/A	150	<0.05	0.23	0.13	0.033	<0.003	<0.05	<0.01	<0.005	50.8	<0.01	<0.02	<0.02	<0.01
17-May-11	94	500	475	7.85	348																			
24-May-11	95	500	450	7.64	333				104															
31-May-11	96	500	450	7.74	329																			
07-Jun-11	97	500	470	7.94	302	#N/A	3.8	93.7	76	#N/A	155	<0.05	0.25	0.14	0.036	<0.003	<0.05	<0.01	<0.005	51.9	<0.01	<0.02	<0.02	<0.01
14-Jun-11	98	500	470	8.02	292																			

Notes: Values in red are below the detection limit. For calculation purposes, values below detection were set at half the value of the analytical limit.

Appendix A-2
Humidity Cell T3 (Silt-Clay Composite)
Results of Leachate Analysis

Date	Cycle No.	Volume mL		Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl	Sn	Ti	U	V	Zn	Zr
		Input	Output	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
28-Jul-09	0	750	380	<0.0003	<0.03	56.4	1.64	1.8	0.033	0.016	<0.1	43.5	0.003	<5	0.0401	135	1.04	658	0.0016	0.0285	<0.03	0.0021	<0.01	0.029	<0.005
04-Aug-09	1	500	435	0.00067	0.011	49.3	1.44	0.06	0.0371	0.0032	0.015	30.8	0.0011	6.8	<0.00003	46.5	0.974	574	0.00122	0.00749	<0.003	0.00185	<0.001	0.0355	<0.0005
11-Aug-09	2	500	445	0.00097	0.012	45.2	2.27	<0.05	0.0268	0.0029	0.01	21.9	0.0005	7.36	<0.00003	23.5	0.972	553	0.00089	0.00667	<0.003	0.00164	<0.001	0.0526	<0.0005
18-Aug-09	3	500	470	0.00079	0.012	36.8	3.5	<0.05	0.0213	0.0038	<0.01	16.5	0.0006	6.53	0.00006	9.5	0.936	561	0.00058	0.0134	<0.003	0.00186	<0.001	0.127	<0.0005
25-Aug-09	4	500	460																						
01-Sep-09	5	500	420	0.00075	0.013	28.5	4.13	<0.1	0.0167	0.0033	<0.02	11.4	<0.0004	7.44	<0.00005	3.65	0.899	473	0.00042	0.0138	0.007	0.00176	<0.002	0.171	<0.001
08-Sep-09	6	500	435																						
15-Sep-09	7	500	455	0.00146	0.012	19.6	5	<0.05	0.014	0.0031	<0.01	8.72	<0.0002	7.59	<0.00003	1.78	0.813	520	0.00038	0.0146	<0.003	0.00158	<0.001	0.242	<0.0005
22-Sep-09	8	500	465																						
29-Sep-09	9	500	395	0.0014	0.01	14.9	2.57	<0.05	0.0094	0.0097	<0.01	7.15	0.0007	7.21	0.00005	1.14	0.683	564	0.00029	0.0113	<0.003	0.00137	<0.001	0.216	<0.0005
06-Oct-09	10	500	400																						
13-Oct-09	11	500	430	0.00048	0.009	14.7	0.492	<0.05	0.0048	0.0037	<0.01	5.85	<0.0002	6.47	0.00006	0.79	0.617	550	0.00022	0.00862	<0.003	0.00162	<0.001	0.269	<0.0005
20-Oct-09	12	500	465																						
27-Oct-09	13	500	480	0.00063	0.009	12	0.422	<0.05	0.0048	0.0033	<0.01	5	<0.0002	7	0.00003	0.56	0.595	500	0.0002	0.00882	<0.003	0.0017	<0.001	0.461	<0.0005
03-Nov-09	14	500	405																						
10-Nov-09	15	500	460	0.0005	0.008	10.3	0.209	<0.05	0.0041	0.0018	<0.01	4.47	<0.0002	6.19	0.00008	0.49	0.547	484	0.00021	0.00631	<0.003	0.00179	<0.001	0.48	<0.0005
17-Nov-09	16	500	490																						
24-Nov-09	17	500	505	0.00146	0.006	6.58	0.697	<0.05	0.0047	0.0016	<0.01	3.23	<0.0002	5.83	<0.00003	0.43	0.393	358	0.00024	0.00811	<0.003	0.00127	<0.001	0.455	<0.0005
01-Dec-09	18	500	470																						
08-Dec-09	19	500	455	0.00038	0.004	4.84	0.0582	<0.05	0.0035	0.0011	<0.01	2.2	<0.0002	4.73	0.00004	0.31	0.228	190	0.00012	0.00473	0.004	0.00084	<0.001	0.242	<0.0005
15-Dec-09	20	500	465																						
22-Dec-09	21	500	445	0.00026	0.003	3.99	0.0322	<0.05	0.0038	0.0011	<0.01	1.79	<0.0002	4.46	<0.00003	0.44	0.168	131	0.00009	0.00456	<0.003	0.00058	<0.001	0.169	<0.0005
29-Dec-09	22	500	435																						
05-Jan-10	23	500	430	0.0002	0.003	3.91	0.0225	<0.05	0.0045	0.0005	<0.01	1.57	<0.0002	4.9	<0.00003	0.27	0.134	104	0.00006	0.00587	<0.003	0.00052	<0.001	0.124	<0.0005
12-Jan-10	24	500	405																						
19-Jan-10	25	500	425	0.00029	<0.005	4.03	0.0199	<0.1	0.0045	0.0043	<0.02	1.54	0.0005	5.01	<0.00005	0.36	0.117	78	0.0001	0.005	0.007	0.00054	<0.002	0.117	<0.001
26-Jan-10	26	500	445																						
02-Feb-10	27	500	485	0.00023	<0.003	3.5	0.0164	<0.05	0.004	0.0005	<0.01	1.34	<0.0002	4.67	0.00008	0.27	0.0904	48	0.00008	0.00538	<0.003	0.00041	<0.001	0.0865	<0.0005
09-Feb-10	28	500	415																						
16-Feb-10	29	500	460	0.00043	<0.003	4.05	0.031	<0.05	0.0049	0.0003	<0.01	1.36	<0.0002	4.69	0.00004	0.28	0.0982	38	0.00007	0.00818	<0.003	0.00045	<0.001	0.0949	<0.0005
23-Feb-10	30	500	490																						
02-Mar-10	31	500	440	0.00034	0.003	3.71	0.0313	<0.05	0.0048	0.0008	<0.01	1.23	0.0003	4.61	0.00004	0.26	0.0868	33	0.00008	0.00626	<0.003	0.00043	<0.001	0.0808	<0.0005
09-Mar-10	32	500	415																						
16-Mar-10	33	500	490	0.00035	<0.003	3.6	0.0299	<0.05	0.0044	0.0004	<0.01	1.1	<0.0002	4.64	<0.00003	<0.3	0.0803	<50	0.00008	0.00804	<0.003	0.00032	<0.001	0.0801	<0.0005
23-Mar-10	34	500	440																						
30-Mar-10	35	500	420	0.00031	<0.003	3.51	0.0116	<0.05	0.0047	0.0004	<0.01	1.03	<0.0002	3.34	<0.00003	0.24	0.0743	29	0.00006	0.0038	<0.003	0.00038	<0.001	0.0582	<0.0005
06-Apr-10	36	500	395																						
13-Apr-10	37	500	415	0.00029	<0.003	3.6	0.0101	<0.05	0.0047	0.0003	<0.01	1	<0.0002	4.54	0.00003	<0.3	0.0687	<50	0.00006	0.00347	<0.003	0.00029	<0.001	0.0481	<0.0005
20-Apr-10	38	500	445	0.0004	<0.003	4.2	0.0235	<0.05	0.0043	0.0003	<0.01	1.1	<0.0002	4.45	0.00004	<0.3	0.0848	<50	0.00007	0.00469	<0.003	0.00034	<0.001	0.0782	<0.0005
27-Apr-10	39	500	500	0.00042	<0.003	3.9	0.104	<0.05	0.0046	0.0004	<0.01	1	<0.0002	4.92	<0.00003	<0.3	0.0699	<50	0.00006	0.00456	<0.003	0.00029	<0.001	0.102	<0.0005
04-May-10	40	500	485																						
11-May-10	41	500	450	0.00058	<0.003	4.2	0.0953	<0.05	0.0038	0.0003	<0.01	1	<0.0002	5.61	<0.00003	<0.3	0.0833	<50	0.00007	0.00537	<0.003	0.00029	<0.001	0.124	<0.0005
18-May-10	42	500	505																						
25-May-10	43	500	410	0.000385	0.001	1.9	0.00754	<0.01	0.00217	0.00023	0.011	0.54	0.00008	2.09	0.000077	0.22	0.0392	<10	0.00003	0.00235	<0.0005	0.00019	<0.0002	0.0166	<0.0001
01-Jun-10	44	500	390																						
08-Jun-10	45	500	415	0.000342	0.0017	3.64	0.0144	<0.01	0.00327	0.00025	0.005	0.95	0.00007	3.86	0.000062	0.33	0.0671	30	0.000065	0.00053	<0.0005	0.00032	<0.0002	0.034	<0.0001
15-Jun-10	46	500	455																						
22-Jun-10	47	500	415	0.000374	0.0017	4.75	0.0118	<0.01	0.00379	0.0003	0.007	1.07	0.00006	3.53	0.000098	0.29	0.0831	37	0.000079	0.00012	<0.0005	0.00039</			

Appendix A-2
Humidity Cell T3 (Silt-Clay Composite)
Results of Leachate Analysis

Date	Cycle No.	Volume mL		Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl	Sn	Ti	U	V	Zn	Zr
		Input	Output	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
06-Jul-10	49	500	420	0.000238	0.0021	5.83	0.0165	<0.01	0.00303	0.00042	0.002	0.97	0.00048	3.85	0.000098	0.4	0.0997	49	0.000045	0.00016	<0.0005	0.00038	<0.0002	0.0671	<0.0001
13-Jul-10	50	500	440																						
20-Jul-10	51	500	460	0.000341	0.0023	5.85	0.0168	<0.01	0.00257	0.00011	0.004	1	0.00007	3.66	0.000106	0.24	0.102	45	0.000062	0.00016	<0.0005	0.0004	<0.0002	0.0927	<0.0001
27-Jul-10	52	500	475																						
03-Aug-10	53	500	455	0.000437	0.0021	5.98	0.0179	<0.01	0.00306	0.00032	0.005	1.05	0.00006	3.79	0.000045	0.23	0.102	53	0.000077	0.00014	<0.0005	0.00041	<0.0002	0.0972	<0.0001
10-Aug-10	54	500	440																						
17-Aug-10	55	500	435	0.000457	0.0019	5.46	0.0163	<0.01	0.00298	0.00034	0.003	0.84	0.00009	3.48	0.000013	0.27	0.0874	42	0.00006	0.0001	<0.0005	0.00036	<0.0002	0.071	<0.0001
24-Aug-10	56	500	430																						
31-Aug-10	57	500	445	0.000327	0.0018	5.4	0.017	<0.01	0.00336	0.00033	0.005	0.83	0.00028	3.3	0.000012	0.25	0.0868	36	0.000062	0.00005	<0.0005	0.00034	<0.0002	0.0624	<0.0001
07-Sep-10	58	500	420																						
14-Sep-10	59	500	395	0.000303	0.0017	5.05	0.0161	<0.01	0.00285	0.00026	0.006	0.78	0.00008	3.55	0.000076	0.27	0.0778	33	0.000044	0.00009	<0.0005	0.00033	<0.0002	0.0629	<0.0001
21-Sep-10	60	500	500																						
28-Sep-10	61	500	290	0.000303	0.0019	5.77	0.0201	<0.01	0.00313	0.0003	0.005	0.85	0.00012	3.73	0.000035	0.28	0.0913	41	0.000051	0.00012	<0.0005	0.0232	<0.0002	0.0606	<0.0001
05-Oct-10	62	500	480																						
12-Oct-10	63	500	390																						
19-Oct-10	64	500	455																						
26-Oct-10	65	500	405	<0.03	#N/A	5.66	0.016	#N/A	<0.02	<0.02	<0.05	0.6	<0.1	2.9	<0.01	0.2	0.081	36.3	#N/A	<0.03	<0.005	#N/A	<0.01	0.055	<0.02
02-Nov-10	66	500	460																						
09-Nov-10	67	500	430																						
16-Nov-10	68	500	400																						
23-Nov-10	69	500	410	<0.03	#N/A	6.06	0.012	#N/A	<0.02	<0.02	<0.05	0.6	<0.1	2.68	<0.01	0.2	0.085	38.9	#N/A	<0.03	<0.005	#N/A	<0.01	0.063	<0.02
30-Nov-10	70	500	415																						
07-Dec-10	71	500	435																						
14-Dec-10	72	500	435																						
21-Dec-10	73	500	445	<0.03	#N/A	7.01	0.011	#N/A	<0.02	<0.02	<0.05	0.9	<0.1	2.99	<0.01	0.3	0.097	40.1	#N/A	<0.03	<0.005	#N/A	<0.01	0.074	<0.02
28-Dec-10	74	500	395																						
04-Jan-11	75	500	495																						
11-Jan-11	76	500	410																						
18-Jan-11	77	500	420	<0.03	#N/A	5.99	0.009	#N/A	<0.02	<0.02	<0.05	0.7	<0.1	3.21	<0.01	0.4	0.084	30.5	#N/A	<0.03	<0.005	#N/A	<0.01	0.066	<0.02
25-Jan-11	78	500	445																						
01-Feb-11	79	500	455																						
08-Feb-11	80	500	440																						
15-Feb-11	81	500	450	<0.03	#N/A	6.12	0.01	#N/A	<0.02	<0.02	<0.05	0.6	<0.1	3.25	<0.01	<0.1	0.085	29.7	#N/A	<0.03	<0.005	#N/A	<0.01	0.074	<0.02
22-Feb-11	82	500	460																						
01-Mar-11	83	500	460																						
08-Mar-11	84	500	430																						
15-Mar-11	85	500	435	<0.03	#N/A	5.74	0.008	#N/A	<0.02	<0.02	<0.05	0.5	<0.1	2.98	<0.01	0.1	0.078	30.1	#N/A	<0.03	<0.005	#N/A	<0.01	0.066	<0.02
22-Mar-11	86	500	445																						
29-Mar-11	87	500	485																						
05-Apr-11	88	500	445																						
12-Apr-11	89	500	340	<0.03	#N/A	4.49	0.006	#N/A	<0.02	<0.02	<0.05	0.5	<0.1	2.72	<0.01	<0.1	0.061	26.8	#N/A	<0.03	<0.005	#N/A	<0.01	0.04	<0.02
19-Apr-11	90	500	450																						
26-Apr-11	91	500	395																						
03-May-11	92	500	460																						
10-May-11	93	500	480	<0.03	#N/A	5.71	0.011	#N/A	<0.02	<0.02	<0.05	0.5	<0.1	3.04	<0.01	0.2	0.072	25.8	#N/A	<0.03	<0.005	#N/A	<0.01	0.065	<0.02
17-May-11	94	500	475																						
24-May-11	95	500	450																						
31-May-11	96	500	450																						
07-Jun-11	97	500	470	<0.03	#N/A	6.15	0.017	#N/A	<0.02	<0.02	<0.05	0.5	<0.1	3.29	<0.01	0.4	0.075	24.2	#N/A	<0.03	<0.005	#N/A	<0.01	0.067	<0.02
14-Jun-11	98	500	470																						

Notes: Values in red are below the detection limit. For calculation purposes, values below detection were set at half the value of the analytical limit.

Appendix B-2

Humidity Cell T4 (CaNP depleted Clay Composite)

Results of Leachate Analysis

Date	Cycle No.	Volume mL		pH	Cond. umhos/cm	Acidity	Acidity	Alkalinity mg CaCO ₃ /L	Sulphate mg/L	Chloride mg/L	Hardness mg CaCO ₃ /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
		(pH 4.5) mg CaCO ₃ /L	(pH 8.3) mg CaCO ₃ /L																					
11-Aug-09	0	500	445	7.29	55	#N/A	5.6	3.2	18	0.7	17	0.0139	0.00914	0.0204	0.0661	0.00003	<0.000005	<0.05	0.00617	5.94	<0.0001	0.000459	0.0181	0.056
18-Aug-09	1	500	450	6.27	88	#N/A	6.3	1.8	30	0.9	28.2	0.0352	0.00887	0.0196	0.0915	0.00007	<0.000005	<0.05	0.0133	10	<0.0001	0.000811	0.0345	0.141
25-Aug-09	2	500	440	6.47	131	#N/A	9.4	2.2	53	<0.5	44.7	0.068	0.00951	0.0283	0.101	0.00012	<0.000005	<0.05	0.0226	15.7	<0.0001	0.0015	0.0832	0.222
01-Sep-09	3	500	445	6.55	166	#N/A	12.9	2.9	71	0.8	56.6	0.11	0.00993	0.0322	0.0784	0.00016	<0.000005	<0.05	0.0303	19.9	<0.0001	0.00201	0.112	0.327
08-Sep-09	4	500	355	5.81	207				85															
15-Sep-09	5	500	475	5.86	272	#N/A	19.9	2.6	114	<0.5	93.9	0.248	0.00994	0.00486	0.0506	0.0003	<0.000005	<0.05	0.056	32.8	<0.0001	0.00404	0.21	0.163
22-Sep-09	6	500	430	4.78	395				200															
29-Sep-09	7	500	440	4.37	577	13.9	59.3	#N/A	286	<0.5	218	1.64	0.012	0.0238	0.0301	0.00154	<0.000005	<0.05	0.183	76.6	0.0006	0.0127	0.939	0.785
06-Oct-09	8	500	440	3.61	703				381															
13-Oct-09	9	500	460	3.44	1159	49.6	192.0	#N/A	601	<0.5	421	10.1	0.0098	0.032	0.0114	0.00504	<0.00003	<0.3	0.54	147	0.0048	0.0334	3.07	7.91
20-Oct-09	10	500	475	3.17	1068				603															
27-Oct-09	11	500	465	3.04	1336	133.7	377.7	#N/A	768	<0.5	333	21.3	0.0124	0.0682	0.0031	0.0087	<0.0001	<1	0.767	117	0.019	0.0412	5.11	14.6
03-Nov-09	12	500	425	2.84	1664				968															
10-Nov-09	13	500	450	2.53	1572	389.1	640.2	#N/A	943	<0.5	338	47.3	0.0148	0.202	0.0021	0.014	<0.0001	<1	1.02	117	0.049	0.0579	7.84	35.2
17-Nov-09	14	500	480	2.74	2142				1217															
24-Nov-09	15	500	420	2.79	2277	517.7	1200	#N/A	1403	<0.5	270	77.2	0.021	0.787	0.002	0.017	<0.0003	<3	1.32	91.8	0.122	0.0724	10.4	86
01-Dec-09	16	500	480	2.60	2512				1612															
08-Dec-09	17	500	435	2.58	2210	600.0	1225	#N/A	1791	<0.5	205	129	0.028	2.43	0.002	0.0193	<0.0003	<3	1.47	65	0.246	0.101	13.2	201
15-Dec-09	18	500	460	2.36	2610				1454															
22-Dec-09	19	500	455	2.35	2980	987.5	1438	#N/A	1515	<0.5	103	84.9	0.023	3.39	0.001	0.0115	<0.0003	<3	0.935	28.2	0.198	0.0689	7.91	165
29-Dec-09	20	500	420	2.31	2990				1419															
05-Jan-10	21	500	445	2.30	3910	987.5	1475	#N/A	1908	<0.5	95.1	97.5	0.0287	5.94	0.0023	0.0122	<0.0001	<1	1.06	20	0.26	0.087	7.94	258
12-Jan-10	22	500	410	2.45	4590				2044															
19-Jan-10	23	500	460	2.49	4740	1375	1800	#N/A	1867	<0.5	79.2	92.1	0.0235	6.84	0.002	0.0109	<0.0001	<1	1.01	14.6	0.266	0.0892	7.36	267
26-Jan-10	24	500	430	2.37	4120				1748															
02-Feb-10	25	500	450	2.87	3390	1175	1325	#N/A	1475	<0.5	47.1	70.9	0.0178	4.78	0.0022	0.0068	<0.0001	<1	0.641	7.6	0.179	0.0687	5.04	244
09-Feb-10	26	500	455	2.25	3470				1581															
16-Feb-10	27	500	480	2.23	3270	975.0	1450	#N/A	1540	<0.5	43.5	66.1	0.018	4.69	0.002	0.0063	<0.0003	<3	0.617	7.5	0.172	0.0692	5.01	299
23-Feb-10	28	500	445	2.19	2980				1246															
02-Mar-10	29	500	480	2.35	3340	1275	1475	#N/A	1222	<0.5	35.7	55.8	0.015	3.51	0.002	0.0052	<0.0003	<3	0.516	6.3	0.149	0.0648	4.72	218
09-Mar-10	30	500	420	2.45	3520				882															
16-Mar-10	31	500	490	2.44	3250	975.0	1475	#N/A	1078	<0.5	22.5	38.2	0.013	2.69	0.002	0.0042	<0.0003	<3	0.359	4	0.101	0.0502	3.54	172
23-Mar-10	32	500	445	2.69	4310				1257															
30-Mar-10	33	500	440	2.61	3680	1275	1450	#N/A	1000	<0.5	22.3	36.2	0.015	2.49	0.0032	0.0036	<0.0001	<1	0.342	4.2	0.103	0.0518	3.56	178
06-Apr-10	34	500	500	2.46	3630				992															
13-Apr-10	35	500	420	2.30	3510	775.0	1200	#N/A	968	<0.5	18.5	31.1	0.0134	2.07	0.0032	0.003	<0.00005	<0.5	0.279	3.5	0.087	0.0463	3.06	163
20-Apr-10	36	500	490	2.41	3120				1057															
27-Apr-10	37	500	465	2.51	3710	800.0	1225	#N/A	1085	<0.5	20.2	42.4	0.014	2.64	0.005	0.0028	<0.0003	<3	0.312	3	0.094	0.0547	3.68	181
04-May-10	38	500	465	2.33	2930				878															
11-May-10	39	500	460	2.97	2520	725.0	1050	#N/A	785	<0.5	15.5	27	0.0126	1.54	0.0031	0.00228	<0.00003	<0.3	0.222	3.3	0.0637	0.037	2.44	123
18-May-10	40	500	415	2.27	2430				786															
25-May-10	41	500	425	2.44	2340	675.0	1075	#N/A	576	<0.5	15.6	26.8	0.0125	1.32	0.0037	0.0025	<0.0001	<1	0.209	3	0.068	0.0408	2.94	112
01-Jun-10	42	500	375	2.89	2510				600															
08-Jun-10	43	500	455	2.32	2590	575.0	725.																	

Appendix B-2

Humidity Cell T4 (CaNP depleted Clay Composite)
Results of Leachate Analysis

Date	Cycle No.	Volume mL		Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl	Sn	Ti	U	V	Zn	Zr
		Input	Output	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	
11-Aug-09	0	500	445	0.00172	0.0019	0.53	0.447	<0.01	<0.00005	0.00201	0.004	0.8	0.00009	3.25	<0.000005	0.87	0.0147	7	0.00008	0.00383	<0.0005	0.000003	<0.0002	0.398	<0.0001
18-Aug-09	1	500	450	0.00134	0.0033	0.77	0.791	<0.01	<0.00005	0.00254	0.003	0.82	0.00019	4.07	0.000007	0.62	0.0241	11	0.000055	0.00472	<0.0005	0.000009	<0.0002	0.709	<0.0001
25-Aug-09	2	500	440	0.00195	0.0049	1.34	1.36	<0.01	<0.00005	0.00453	<0.002	1.08	0.00021	5.66	0.000018	0.79	0.0364	18	0.000078	0.00559	<0.0005	0.000026	<0.0002	1.36	<0.0001
01-Sep-09	3	500	445	0.00315	0.0061	1.69	1.68	0.01	<0.00005	0.00656	<0.002	1.16	0.00027	6.65	0.000016	0.76	0.0454	22	0.000095	0.00745	<0.0005	0.000026	<0.0002	1.84	<0.0001
08-Sep-09	4	500	355																						
15-Sep-09	5	500	475	0.00197	0.01	2.93	3.12	<0.01	<0.00005	0.0114	0.003	1.64	0.00042	9.46	0.000032	0.87	0.0682	39	0.000147	0.012	<0.0005	0.000076	<0.0002	3.53	<0.0001
22-Sep-09	6	500	430																						
29-Sep-09	7	500	440	0.00462	0.0142	6.57	7.52	<0.01	<0.00005	0.0311	0.002	2.69	0.00043	13.5	0.00004	0.91	0.136	93	0.000249	0.0304	<0.0005	0.000612	<0.0002	10.2	<0.0001
06-Oct-09	8	500	440																						
13-Oct-09	9	500	460	0.00201	0.023	12.8	16.3	<0.05	<0.0003	0.0759	<0.01	3.31	0.0004	22.7	0.00026	0.99	0.244	208	0.00027	0.065	<0.003	0.00223	<0.001	29.8	<0.0005
20-Oct-09	10	500	475																						
27-Oct-09	11	500	465	0.0059	0.019	10	15.8	<0.2	<0.001	0.079	<0.04	1.8	<0.0008	21.8	0.0004	0.6	0.196	214	0.00024	0.105	<0.01	0.00586	<0.004	42.9	<0.002
03-Nov-09	12	500	425																						
10-Nov-09	13	500	450	0.002	0.023	11.3	17.6	<0.2	<0.001	0.0942	<0.04	1.5	<0.0008	27.8	0.0008	0.6	0.166	280	0.00023	0.0909	<0.01	0.0114	0.01	52.3	<0.002
17-Nov-09	14	500	480																						
24-Nov-09	15	500	420	0.0546	<0.03	10	16.3	<0.5	<0.003	0.093	<0.1	0.7	<0.002	34.3	0.0008	0.8	0.101	431	0.0002	0.109	<0.03	0.024	<0.01	68.1	<0.005
01-Dec-09	16	500	480																						
08-Dec-09	17	500	435	0.0035	<0.03	10.3	13.6	<0.5	<0.003	0.104	0.195	0.6	<0.002	42.2	0.001	<0.5	0.07	513	0.0002	0.112	<0.03	0.0489	0.03	79	<0.005
15-Dec-09	18	500	460																						
22-Dec-09	19	500	455	0.0069	<0.03	7.9	6.24	<0.5	<0.003	0.073	0.145	<0.5	<0.002	29.4	0.0012	1.2	0.034	441	0.0001	0.097	<0.03	0.0399	<0.01	48.5	<0.005
29-Dec-09	20	500	420																						
05-Jan-10	21	500	445	0.0022	0.026	10.9	5.64	<0.2	0.001	0.079	0.392	<0.2	0.0009	34.8	0.0009	0.4	0.029	563	0.00005	0.106	<0.01	0.0495	0.03	57.4	<0.002
12-Jan-10	22	500	410																						
19-Jan-10	23	500	460	0.0021	0.025	10.4	4.47	<0.2	0.007	0.0723	0.538	<0.2	<0.0008	33.7	0.0007	0.5	0.026	603	0.00009	0.0876	0.012	0.0373	0.026	51.2	<0.002
26-Jan-10	24	500	430																						
02-Feb-10	25	500	450	0.0018	0.017	6.8	2.56	<0.2	<0.001	0.0521	0.497	0.3	<0.0008	22.2	0.0009	0.5	0.024	472	0.00011	0.057	<0.01	0.0242	0.016	33.5	<0.002
09-Feb-10	26	500	455																						
16-Feb-10	27	500	480	0.0011	<0.03	6	2.34	<0.5	<0.003	0.05	0.288	<0.5	<0.002	37.1	0.0005	<0.5	0.028	434	<0.0001	0.0702	<0.03	0.0217	0.015	32.3	<0.005
23-Feb-10	28	500	445																						
02-Mar-10	29	500	480	0.0135	<0.03	4.8	1.92	<0.5	<0.003	0.045	0.172	<0.5	<0.002	26.5	0.0004	<0.5	0.03	371	<0.0001	0.0636	<0.03	0.0166	<0.01	28.5	<0.005
09-Mar-10	30	500	420																						
16-Mar-10	31	500	490	0.0011	<0.03	3	1.21	<0.5	<0.003	0.039	0.103	<3	<0.002	21.2	0.0005	<3	0.025	<500	<0.0001	0.0605	<0.03	0.0105	<0.01	19.7	<0.005
23-Mar-10	32	500	445																						
30-Mar-10	33	500	440	0.0009	0.012	2.8	1.15	<0.2	<0.001	0.0339	0.215	<0.2	<0.0008	19.2	0.0002	0.6	0.03	329	0.00008	0.0601	<0.01	0.00999	0.006	18.1	<0.002
06-Apr-10	34	500	500																						
13-Apr-10	35	500	420	0.00039	0.012	2.4	0.94	<0.1	<0.0005	0.0305	0.188	<0.5	<0.0004	21.6	0.00035	0.5	0.0273	288	0.00007	0.0438	<0.005	0.00848	0.007	14.7	<0.001
20-Apr-10	36	500	490																						
27-Apr-10	37	500	465	0.0005	<0.03	<3	1.07	<0.5	<0.003	0.036	0.2	<3	<0.002	28.5	<0.0003	<3	0.035	<500	<0.0001	0.0635	<0.03	0.0087	<0.01	16.6	<0.005
04-May-10	38	500	465																						
11-May-10	39	500	460	0.00049	0.01	1.7	0.691	<0.05	<0.0003	0.0218	0.135	<0.3	0.0004	19.9	0.0003	0.6	0.0298	260	0.00005	0.0455	<0.003	0.0057	0.003	11.1	<0.0005
18-May-10	40	500	415																						
25-May-10	41	500	425	0.0018	0.01	2	0.761	<0.2	0.001	0.0258	0.107	<1	<0.0008	18.2	0.0007	<1	0.032	245	0.00008	0.0344	<0.01	0.00585	<0.004	11.4	<0.002
01-Jun-10	42	500	375																						
08-Jun-10	43	500	455	0.002	0.011	2	0.715	<0.2	<0.001	0.0242	0.14	<1	<0.0008	21.9	0.0005	<1	0.03	241	0.00006	0.0306	<0.01	0.0055	<0.004	11	<0.002
15-Jun-10	44	500	445																						
22-Jun-10	45	500	470	0.00071	0.009	1.6	0.671	<0.05	0.0017	0.0208	0.115	<0.3	<0.0002	15.8	0.00052	0.7	0.0329	195	0.00005	0.0341	<0.003	0.00499	0.003	9.69	<0.0005
29-Jun-10	46	500	445																						
06-Jul-10	47	500	520	0.00065	0.0058	0.74	0.33	<0.01	0.00008	0.0102	0.033	0.08	0.00005	9.84	0.000267	0.46	0.02	115	0.000051	0.0173	<0.0005	0.0026	0.0014	4.66	<0.0001
13-Jul-10	48	500	425																						
20-Jul-10	49	500	520	0.00022	0.007	1	0.439	<0.05	<0.0003	0.014	0.043	<0.3	<0.0002	15.1	0.00037	0.7	0.0298	137	0.00004	0.0272	<0.003	0.00264	0.003	6.1	<0.0005
27-Jul-10	50	500	500																						
03-Aug-10	51	500	480	0.000624	0.0061	0.74	0.346	<0.01	0.00007	0.0099	0.036	<0.05	0.00005	11.5	0.000361	0.55	0.0235	120	0.000044	0.0183	<0.0005	0.00201	0.001	4.54	<0.0001
10-Aug-10	52	500	440																						
17-Aug-10	53	500	445	0.00319	0.0059	0.65	0.269	<0.01	<0.00005	0.0078	0.023	0.05	0.00005	9.54	0.000332	0.57	0.0192	92	0.000054	0.0132	<0.0005	0.00182	0.0008	3.6	<0.0001
24-Aug-10	54	500	505																						
31-Aug-10	55	500	450	0.000466	0.0065	0.72	0.305	<0.01	0.00008	0.009	0.026	<0.05	<0.00004	9.42	0.00026	0.6	0.0228	93	0.000046	0.0141	<0.0005	0.00183	0.0007	3.61	<0.0001
07-Sep-10	56	500	450																						
14-Sep-10	57	500	465	0.00014	0.007	0.81	0.32	<0.01	0.00006	0.00893	0.036	<0.05	0.00006	11.1	0.000429	0.63	0.023	98	0.000043	0.0183	<0.0005	0.00212	0.001	3.75	<0.0001
21-Sep-10	58	500	455																						
28-Sep-10	59	500	460	0.000613	0.00																				

Appendix A-2

Humidity Cell T5 (CaNP depleted Sand-Silt Composite)

Results of Leachate Analysis

Date	Cycle No.	Volume mL		pH	Cond. umhos/cm	Acidity (pH 4.5)	Acidity (pH 8.3)	Alkalinity	Sulphate	Chloride	Hardness	Al	Sb	As	Ba	Be	Bi	B	Cd	Ca	Cr	Co	Cu	Fe	Pb
		Input	Output			mg CaCO ₃ /Ing	CaCO ₃ /Ing	CaCO ₃ /I	mg/L	mg/L	ng CaCO ₃ /I	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
11-Aug-09	0	500	455	7.08	49	#N/A	4.6	2.7	15	<0.5	18.1	0.0032	0.0114	0.0146	0.0241	<0.00001	<0.000005	<0.05	0.00155	5.89	<0.0001	0.000487	0.00709	0.006	0.0098
18-Aug-09	1	500	420	5.99	207	#N/A	6.9	1.2	92	1.2	87.1	0.005	0.0162	0.0346	0.0927	0.00001	<0.000005	<0.05	0.011	27.9	<0.0001	0.00229	0.0128	0.025	0.0179
25-Aug-09	2	500	375	6.19	391	#N/A	12.9	1.9	202	<0.5	174	0.0185	0.0179	0.0491	0.108	0.00006	<0.000005	<0.05	0.0312	55.2	<0.0001	0.00649	0.0687	0.097	0.0319
01-Sep-09	3	500	415	5.96	518	#N/A	25.1	2.1	251	0.6	231	0.051	0.018	0.0228	0.0614	0.00012	<0.00003	<0.3	0.0514	70.8	<0.0005	0.0115	0.111	0.044	0.0417
08-Sep-09	4	500	370	5.32	601				306																
15-Sep-09	5	500	450	4.94	677	#N/A	43.1	<0.1	357	<0.5	278	0.212	0.0169	0.0193	0.0162	0.00042	<0.00003	<0.3	0.105	80.1	<0.0005	0.0212	0.266	0.141	0.0231
22-Sep-09	6	500	420	4.77	638				336																
29-Sep-09	7	500	460	4.48	568	2.7	41.2	#N/A	292	<0.5	231	0.309	0.0125	0.0097	0.009	0.00059	<0.00003	<0.3	0.113	60.3	<0.0005	0.0203	0.356	0.201	0.00905
06-Oct-09	8	500	455	4.13	682				369																
13-Oct-09	9	500	440	4.05	826	8.8	74.2	#N/A	440	<0.5	316	1.26	0.0095	0.0064	0.0056	0.00183	<0.00003	<0.3	0.248	76.2	<0.0005	0.0344	1.02	0.35	0.0122
20-Oct-09	10	500	400	3.57	1000				577																
27-Oct-09	11	500	520	3.41	1102	51.1	211.9	#N/A	611	<0.5	338	5.74	0.012	0.0366	0.004	0.0078	<0.0001	<1	0.639	75.2	<0.002	0.0463	4.05	15.5	0.0313
03-Nov-09	12	500	435	3.03	1323				729																
10-Nov-09	13	500	420	2.60	1315	219.5	459.9	#N/A	720	<0.5	287	21.6	0.023	0.657	0.006	0.015	<0.0003	<3	0.956	57.2	0.02	0.0484	9.4	54.3	0.0749
17-Nov-09	14	500	470	2.89	1419				624																
24-Nov-09	15	500	450	2.95	1440	194.4	525.9	#N/A	694	<0.5	165	24.1	0.023	0.769	0.006	0.011	<0.0005	<5	0.795	27	0.027	0.0349	8.85	80.7	0.0631
01-Dec-09	16	500	475	2.73	1647				821																
08-Dec-09	17	500	485	2.79	1189	550.0	875.0	#N/A	1000	<0.5	106	44	0.031	3.64	0.006	0.009	<0.0005	<5	0.88	15	0.069	0.0463	9.43	175	0.13
15-Dec-09	18	500	455	2.34	3310				1618																
22-Dec-09	19	500	460	2.35	4150	1700	3425	#N/A	2522	1.6	102	75	0.094	32.5	0.013	0.006	0.0011	<5	1.49	9	0.207	0.0866	10.2	465	0.432
29-Dec-09	20	500	465	2.29	5290				3276																
05-Jan-10	21	500	425	2.21	7750	1875	2588	#N/A	4999	<0.5	123	77.6	0.217	169	0.009	0.007	0.0133	<5	2.41	9	0.333	0.155	10.4	1430	0.445
12-Jan-10	22	500	430	2.30	9930				5905																
19-Jan-10	23	500	450	2.46	9210	1975	3325	#N/A	5425	<0.5	114	56	0.22	197	0.005	0.006	0.0102	<5	2.51	9	0.381	0.179	9.04	1600	0.206
26-Jan-10	24	500	445	2.45	8040				5860																
02-Feb-10	25	500	450	2.69	8180	1875	2375	#N/A	4608	<0.5	66.7	42.1	0.188	137	0.005	0.005	0.0049	<5	1.81	9	0.292	0.142	6.32	1480	0.108
09-Feb-10	26	500	415	2.14	7200				4880																
16-Feb-10	27	500	425	2.09	6000	2800	3350	#N/A	3707	<0.5	45.1	32.1	0.118	57.8	0.002	0.0038	0.0007	<3	1.22	7.5	0.216	0.112	5.8	1070	0.0222
23-Feb-10	28	500	480	2.10	4840				3043																
02-Mar-10	29	500	410	2.09	7940	2950	3050	#N/A	4571	<0.5	43	37.3	0.163	110	0.004	0.004	0.003	<5	1.14	10	0.238	0.142	6.58	1400	0.0401
09-Mar-10	30	500	450	2.14	110500				3736																
16-Mar-10	31	500	455	2.13	8020	2750	3450	#N/A	4033	<0.5	20.6	27.7	0.142	69.2	0.014	0.003	0.0014	<5	0.828	8	0.169	0.123	5.22	1180	0.0222
23-Mar-10	32	500	460	2.39	10500				4699																
30-Mar-10	33	500	450	2.27	10660	2850	3450	#N/A	4505	<0.5	37.5	25	0.143	66.2	0.004	0.0022	0.0011	<3	0.678	10.6	0.153	0.127	4.85	1180	0.0187
06-Apr-10	34	500	450	2.09	10880				4728																
13-Apr-10	35	500	455	2.01	10630	2800	3450	#N/A	3880	<0.5	34.9	22.9	0.142	58.8	0.003	0.0021	0.0016	<3	0.568	10	0.134	0.124	4.03	1170	0.0169
20-Apr-10	36	500	455	2.02	10130				4828																
27-Apr-10	37	500	440	2.03	10960	2800	3550	#N/A	4186	<0.5	35.7	28.3	0.147	61.4	0.004	0.0019	0.0015	<3	0.492	10	0.14	0.132	4.16	1220	0.0153
04-May-10	38	500	420	2.21	6970				4157																
11-May-10	39	500	425	2.69	3700	2750	3400	#N/A	3948	<0.5	25	23.8	0.139	45.2	0.002	0.0022	0.0006	<3	0.44	10	0.108	0.119	3.72	1080	0.0067
18-May-10	40	500	490	2.39	6290				2687																
25-May-10	41	500	445	2.09	6780	2700	3450	#N/A	2986	<0.5	23.6	23.3	0.126	42.4	0.003	0.0017	0.0011	<3	0.32	9	0.107	0.128	3.86	1060	0.0092
01-Jun-10	42	500	410	2.69	8900																				

Appendix A-2

Humidity Cell T5 (CaNP depleted Sand-Silt Composite)

Results of Leachate Analysis

Date	Cycle No.	Volume mL		Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl	Sn	Ti	U	V	Zn	Zr
		Input	Output	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
11-Aug-09	0	500	455	<0.0005	0.83	0.649	<0.01	<0.00005	0.00123	0.003	0.21	0.00004	1.38	<0.000005	0.55	0.0103	7	0.000012	0.00311	<0.0005	0.000003	<0.0002	0.17	<0.0001
18-Aug-09	1	500	420	0.0014	4.24	3.64	<0.01	<0.00005	0.00321	0.003	0.55	0.00015	3.44	<0.000005	0.94	0.0484	33	0.00002	0.00549	<0.0005	0.000002	<0.0002	1.02	<0.0001
25-Aug-09	2	500	375	0.0027	8.69	8.6	<0.01	<0.00005	0.00867	0.003	0.88	0.00032	6.1	0.000017	1.16	0.0867	65	0.000034	0.00799	<0.0005	0.000011	<0.0002	2.96	<0.0001
01-Sep-09	3	500	415	0.004	13.1	12.8	<0.05	<0.0003	0.0143	<0.01	1.16	0.0004	8.11	0.00005	1.17	0.112	76	0.00007	0.0102	<0.003	0.00002	<0.001	5.65	<0.0005
08-Sep-09	4	500	370																					
15-Sep-09	5	500	450	0.007	18.9	20.1	<0.05	<0.0003	0.0248	<0.01	1.35	0.0003	12.3	0.00008	0.8	0.127	112	0.00006	0.0273	<0.003	0.00011	<0.001	10.5	<0.0005
22-Sep-09	6	500	420																					
29-Sep-09	7	500	460	0.006	19.7	18.3	<0.05	<0.0003	0.0225	<0.01	1.29	<0.0002	10.7	0.00008	0.51	0.0996	108	0.00005	0.0407	<0.003	0.00018	<0.001	10.2	<0.0005
06-Oct-09	8	500	455																					
13-Oct-09	9	500	440	0.007	30.6	28.5	<0.05	<0.0003	0.0375	<0.01	1.25	<0.0002	11.4	0.00016	0.42	0.135	145	0.00007	0.0612	<0.003	0.00069	<0.001	18.4	<0.0005
20-Oct-09	10	500	400																					
27-Oct-09	11	500	520	<0.01	36.6	34.9	<0.2	<0.001	0.0527	<0.04	1	<0.0008	15.2	0.0003	0.4	0.174	185	0.0001	0.139	<0.01	0.00394	<0.004	33.8	<0.002
03-Nov-09	12	500	435																					
10-Nov-09	13	500	420	<0.03	35.1	30.4	<0.5	<0.003	0.049	<0.1	1.5	<0.002	19.3	0.0006	<0.5	0.169	242	0.0001	0.208	<0.03	0.0117	0.012	39.3	<0.005
17-Nov-09	14	500	470																					
24-Nov-09	15	500	450	<0.05	24	19.2	<1	<0.005	0.04	<0.2	<1	<0.004	18.9	<0.0005	<1	0.112	255	<0.0002	0.243	<0.05	0.0121	<0.02	35.8	<0.01
01-Dec-09	16	500	475																					
08-Dec-09	17	500	485	<0.05	17	19.3	<1	<0.005	0.037	<0.2	<1	<0.004	20	0.0014	<1	0.097	319	0.0002	0.251	<0.05	0.0194	0.035	47.4	<0.01
15-Dec-09	18	500	455																					
22-Dec-09	19	500	460	<0.05	19	24.6	<1	<0.005	0.064	<0.2	<1	<0.004	28.5	0.0017	2	0.094	735	0.0003	0.267	<0.05	0.0408	0.048	96.8	<0.01
29-Dec-09	20	500	465																					
05-Jan-10	21	500	425	<0.05	24	20.4	<1	0.005	0.122	2.08	<1	<0.004	32	0.0072	<1	0.084	1560	<0.0002	0.281	<0.05	0.0404	0.116	182	<0.01
12-Jan-10	22	500	430																					
19-Jan-10	23	500	450	<0.05	22	11.5	<1	0.017	0.145	4	<1	<0.004	32.6	0.012	1	0.062	1940	0.0003	0.212	0.077	0.0249	0.122	162	<0.01
26-Jan-10	24	500	445																					
02-Feb-10	25	500	450	<0.05	11	5.36	<1	<0.005	0.086	3.97	<1	<0.004	30.6	0.0147	2	0.058	1700	0.0004	0.158	<0.05	0.0174	0.094	106	<0.01
09-Feb-10	26	500	415																					
16-Feb-10	27	500	425	<0.03	6.4	3.6	<0.5	<0.003	0.06	1.87	<0.5	<0.002	26.1	0.0094	0.5	0.05	1080	0.0003	0.152	<0.03	0.0128	0.095	73	<0.005
23-Feb-10	28	500	480																					
02-Mar-10	29	500	410	<0.05	5	2.9	<1	<0.005	0.078	4.14	<1	<0.004	23.4	0.0124	<1	0.057	1540	0.0003	0.158	<0.05	0.0117	0.086	71.4	<0.01
09-Mar-10	30	500	450																					
16-Mar-10	31	500	455	<0.05	<5	1.91	<1	<0.005	0.063	2.57	<5	<0.004	21.6	0.0106	<5	0.05	1290	0.0003	0.131	<0.05	0.0087	0.07	55.9	<0.01
23-Mar-10	32	500	460																					
30-Mar-10	33	500	450	<0.03	2.7	1.54	<0.5	<0.003	0.059	3.77	<0.5	<0.002	15.6	0.0043	0.6	0.048	1310	0.0002	0.115	<0.03	0.0076	0.062	47	<0.005
06-Apr-10	34	500	450																					
13-Apr-10	35	500	455	<0.03	<3	1.25	<0.5	<0.003	0.054	3.7	<3	<0.002	19.9	0.0085	<3	0.045	1090	0.0004	0.0953	<0.03	0.0064	0.059	39.5	<0.005
20-Apr-10	36	500	455																					
27-Apr-10	37	500	440	<0.03	<3	1.23	0.5	<0.003	0.06	4.52	<3	<0.002	22.3	0.007	<3	0.043	1410	0.0002	0.0988	<0.03	0.0064	0.067	35.2	<0.005
04-May-10	38	500	420																					
11-May-10	39	500	425	<0.03	<3	1.04	<0.5	<0.003	0.049	3.2	<3	<0.002	20.9	0.0066	<3	0.041	1200	0.0002	0.112	<0.03	0.0057	0.051	30.5	<0.005
18-May-10	40	500	490																					
25-May-10	41	500	445	<0.03	<3	0.922	<0.5	<0.003	0.052	3.45	<3	<0.002	15.2	0.0079	<3	0.045	1200	0.0002	0.0917	<0.03	0.005	0.045	21.9	<0.005
01-Jun-10	42	500	410																					
08-Jun-10	43	500	425	<0.03	3	1.1	<0.5	<0.003	0.067	5.81	<3	<0.002	24.8	0.0082	<3	0.054	1440	0.0002	0.0947	<0.03	0.0067	0.069	23.2	<0.005
15-Jun-10	44	500	410																					
22-Jun-10	45	500	440	<0.03	<3	0.963	<0.5	0.004	0.049	4.17	<3	<0.002	17.3	0.0078	<3	0.047	1080	0.0002	0.0834	<0.03	0.0051	0.05	17.9	<0.005
29-Jun-10	46	500	420																					
06-Jul-10	47	500	465	<0.03	<3	0.691	<0.5	<0.003	0.038	2.39	<3	<0.002	16.1	0.0047	<3	0.04	870	0.0001	0.0642	<0.03	0.0033	0.034	13.1	<0.005
13-Jul-10	48	500	455																					
20-Jul-10	49	500	495	<0.005	1.2	0.434	<0.1	<0.0005	0.0216	0.288	<0.5	<0.0004	10.9	0.00265	<0.5	0.0239	394	0.00021	0.0408	<0.005	0.00205	0.03	5.92	<0.001
27-Jul-10	50	500	455																					
03-Aug-10	51	500	410	<0.03	<3	0.749	<0.5	<0.003	0.067	5.56	<3	<0.002	17.3	0.0064	<3	0.048	1340	0.0002	0.0868	<0.03	0.0043	0.037	13.4	<0.005
10-Aug-10	52	500	495																					
17-Aug-10	53	500	435	<0.01	2	0.562	<0.2	0.001	0.0426	3.39	<1	0.0008	12.1	0.0049	<1	0.04	912	0.00016	0.0606	<0.01	0.0037	0.031	8.42	<0.002
24-Aug-10	54	500	460																					
31-Aug-10	55	500	435	<0.01	2	0.499	<0.2	0.001	0.0387	3.91	<1	<0.0008	13.3	0.0053	<1	0.036	1040	0.00011	0.0554	<0.01	0.00274	0.029	7.28	<0.002
07-Sep-10	56	500	445																					
14-Sep-10	57	500	430	<0.03	<3	0.509	<0.5	<0.003	0.06	4.79	<3	<0.002	14.4	0.005	<3	0.036	1080	<0.0001	0.0522	<0.03	0.0047	0.029	6.6	<0.005
21-Sep-10	58	500	460																					
28-Sep-10	59	500	465	<0.03	<3	0.502	<0.5	<0.003	0.044	3.57	<3	<0.002	15.1	0.0049	<3	0.034	970	<0.0001	0.0534	<0.03	0.003	0.021	6.01	<0.005

Notes: Values in red are below the detection limit. For calculatcalculation purposes, values below detection were set at the value of the analytical limit.

Appendix A-2

Humidity Cell T6 (CaNP depleted Silt-Clay Composite)

Results of Leachate Analysis

Date	Cycle No.	Volume mL		pH	Cond.	Acidity	Acidity	Alkalinity	Sulphate	Chloride	Hardness	Al	Sb	As	Ba	Be	Bi	B	Cd	Ca	Cr	Co	Cu	Fe
		Input	Output		umhos/cm	(pH 4.5)	(pH 8.3)	CaCO ₃ /I																
					mg CaCO ₃ /Ing	mg CaCO ₃ /Ing	CaCO ₃ /I	mg/L																
11-Aug-09	0	500	405	7.35	33	#N/A	4.4	3.9	8	0.7	10.3	0.0024	0.00866	0.0117	0.0313	<0.00001	<0.000005	<0.05	0.00118	3.23	<0.0001	0.000291	0.00795	0.004
18-Aug-09	1	500	490	5.47	87	#N/A	5.7	0.8	26	0.6	28.7	0.0084	0.0146	0.0254	0.0729	0.00002	<0.000005	<0.05	0.0063	9.05	<0.0001	0.00109	0.0415	0.032
25-Aug-09	2	500	410	5.79	234	#N/A	11.3	1.4	94	<0.5	90	0.0382	0.0199	0.0464	0.12	0.00007	<0.000005	<0.05	0.0223	27.7	<0.0001	0.00414	0.103	0.119
01-Sep-09	3	500	445	5.65	205	#N/A	13.5	2.4	92	0.9	75.2	0.0456	0.0217	0.0605	0.0666	0.00007	<0.000005	<0.05	0.0214	22.7	<0.0001	0.00385	0.113	0.107
08-Sep-09	4	500	435	5.41	335				158															
15-Sep-09	5	500	430	5.39	394	#N/A	26.1	1.9	174	<0.5	148	0.151	0.0278	0.119	0.0495	0.00019	<0.00003	<0.3	0.0543	43	<0.0005	0.00956	0.307	0.493
22-Sep-09	6	500	445	5.64	340				162															
29-Sep-09	7	500	425	4.99	319	#N/A	21.0	0.5	148	<0.5	122	0.131	0.0264	0.0967	0.0267	0.00019	<0.000005	<0.05	0.0459	34.5	<0.0001	0.00896	0.264	0.539
06-Oct-09	8	500	470	4.80	335				172															
13-Oct-09	9	500	470	4.49	460	2.0	32.4	#N/A	245	<0.5	179	0.4	0.0226	0.0654	0.0292	0.00049	<0.00003	<0.3	0.0936	48.3	<0.0005	0.0153	0.652	0.241
20-Oct-09	10	500	450	4.30	460				234															
27-Oct-09	11	500	440	4.18	523	6.1	50.1	#N/A	264	<0.5	173	0.742	0.0246	0.0885	0.0214	0.001	<0.0001	<1	0.146	45	<0.002	0.0188	1.23	0.508
03-Nov-09	12	500	520	4.21	476				242															
10-Nov-09	13	500	435	4.72	336	#N/A	33.0	1.0	179	<0.5	133	0.645	0.0173	0.0028	0.0158	0.001	<0.0001	<1	0.108	32.8	<0.002	0.0155	1.09	1.61
17-Nov-09	14	500	455	3.96	442				186															
24-Nov-09	15	500	510	4.08	383	8.4	41.4	#N/A	181	0.6	111	0.614	0.01	0.002	0.016	0.0008	<0.0003	<3	0.107	25.8	<0.005	0.0153	1.15	1.89
01-Dec-09	16	500	460	3.84	477				217															
08-Dec-09	17	500	480	3.66	579	24.3	97.9	#N/A	269	<0.5	164	2.63	0.011	0.013	0.014	0.0028	<0.0003	<3	0.225	35.3	<0.005	0.0273	3.35	5.77
15-Dec-09	18	500	470	3.62	652				304															
22-Dec-09	19	500	470	3.25	816	60.0	206.9	#N/A	455	<0.5	207	10.9	0.019	0.065	0.013	0.007	<0.0005	<5	0.489	43	<0.01	0.0463	8.08	13.6
29-Dec-09	20	500	465	3.04	1253				522															
05-Jan-10	21	500	420	2.87	1927	382.2	905.9	#N/A	981	<0.5	193	50.6	0.044	1.3	0.01	0.015	<0.0005	<5	1.2	37	0.044	0.0844	16.4	58.9
12-Jan-10	22	500	430	2.53	2345				1432															
19-Jan-10	23	500	440	2.63	3290	675.0	1075	#N/A	1219	<0.5	108	68.2	0.057	2.94	0.008	0.0137	<0.0003	<3	1.61	18.4	0.093	0.112	13.9	137
26-Jan-10	24	500	435	2.71	2900				1545															
02-Feb-10	25	500	450	2.89	3190	800.0	1275	#N/A	1636	<0.5	72.9	64.4	0.073	8.09	0.007	0.0086	<0.0003	<3	1.64	7.4	0.115	0.0919	9.6	266
09-Feb-10	26	500	415	2.10	3400				1803															
16-Feb-10	27	500	460	2.41	2790	850.0	1375	#N/A	1483	<0.5	68	41	0.067	4.82	0.003	0.005	<0.0005	<5	1.23	5	0.082	0.0602	6.3	328
23-Feb-10	28	500	485	2.21	2410				1415															
02-Mar-10	29	500	395	2.20	2430	1450	2375	#N/A	2254	<0.5	87.2	58.2	0.107	21.2	0.004	0.006	<0.0005	<5	1.62	4	0.14	0.0961	7.87	540
09-Mar-10	30	500	480	2.33	4170				1656															
16-Mar-10	31	500	445	2.46	3190	1050	1775	#N/A	2225	<0.5	67	43	0.09	16.6	0.014	0.005	<0.0005	<5	1.35	<5	0.114	0.0859	6.76	556
23-Mar-10	32	500	485	2.58	3840				1357															
30-Mar-10	33	500	430	2.51	3710	1100	1725	#N/A	2538	<0.5	68.2	41.3	0.089	17.8	0.013	0.004	<0.0005	<5	1.17	3	0.107	0.0903	6.78	570
06-Apr-10	34	500	470	2.30	3700				1266															
13-Apr-10	35	500	485	2.29	3680	825.0	1775	#N/A	1430	<0.5	43.3	17.8	0.058	3.21	0.004	0.0024	<0.0001	<1	0.616	3	0.053	0.0462	4.28	282
20-Apr-10	36	500	480	2.40	4160				1875															
27-Apr-10	37	500	445	2.44	4370	850.0	1725	#N/A	1862	<0.5	35.8	33.2	0.077	12	0.004	0.0028	<0.0003	<3	0.731	<3	0.085	0.0756	5.69	456
04-May-10	38	500	485	2.45	3120				1501															
11-May-10	39	500	425	2.62	2930	1225	1700	#N/A	2205	<0.5	36.1	33.1	0.092	17	0.003	0.0029	<0.0003	<3	0.685	4	0.087	0.0839	5.81	518
18-May-10	40	500	405	2.49	3240				1704															
25-May-10	41	500	435	2.25	3350	1450	1775	#N/A	1277	<0.5	27.1	27.5	0.075	11.7	0.003	0.0022	<0.0003	<3	0.494	3	0.075	0.0763	4.96	438
01-Jun-10	42	5																						

Notes: Values in red are below the detection limit. For calculation purposes, values below detection were set at half the value of the analytical limit.

Appendix A-2

Humidity Cell T6 (CaNP depleted Silt-Clay Compo

Results of Leachate Analysis

Date	Cycle No.	Volume mL		Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl	Sn	Ti	U	V	Zn	Zr
		Input	Output	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
11-Aug-09	0	500	405	0.000574	0.0006	0.55	0.373	<0.01	<0.00005	0.00073	0.002	0.27	<0.00004	2.12	0.000006	0.75	0.00837	4	0.00002	0.0035	<0.0005	<0.000002	0.0002	0.128	<0.0001
18-Aug-09	1	500	490	0.00802	0.0017	1.47	1.39	<0.01	<0.00005	0.00204	<0.002	0.46	0.00005	3.8	0.000005	0.75	0.0226	12	0.000075	0.00682	<0.0005	0.000002	<0.0002	0.579	<0.0001
25-Aug-09	2	500	410	0.0112	0.0041	5.03	4.77	<0.01	<0.00005	0.00711	0.004	0.9	0.00022	9.68	0.000026	1.44	0.0602	34	0.000062	0.009	<0.0005	0.000016	<0.0002	2.08	<0.0001
01-Sep-09	3	500	445	0.0125	0.0035	4.48	4.07	<0.01	<0.00005	0.0066	<0.002	1.07	0.00017	7.56	0.000025	1.1	0.0474	29	0.00013	0.00804	<0.0005	0.000012	<0.0002	2.01	<0.0001
08-Sep-09	4	500	435																						
15-Sep-09	5	500	430	0.0152	0.006	9.91	9.49	<0.05	<0.0003	0.0165	<0.01	1.28	0.0002	13.4	0.00007	0.93	0.0899	57	0.00012	0.028	<0.003	0.00004	<0.001	5.45	<0.0005
22-Sep-09	6	500	445																						
29-Sep-09	7	500	425	0.00932	0.0064	8.8	8.14	<0.01	<0.00005	0.0134	0.002	1.26	0.00014	12.8	0.00004	0.59	0.0695	51	0.000106	0.0323	<0.0005	0.000032	<0.0002	4.23	<0.0001
06-Oct-09	8	500	470																						
13-Oct-09	9	500	470	0.0126	0.007	14.1	12.9	<0.05	<0.0003	0.0238	<0.01	1.39	<0.0002	12.2	0.00012	0.47	0.101	82	0.00009	0.0395	<0.003	0.00008	<0.001	8.36	<0.0005
20-Oct-09	10	500	450																						
27-Oct-09	11	500	440	0.0188	<0.01	14.8	15.3	<0.2	<0.001	0.0308	<0.04	1.5	<0.0008	12.4	0.0002	0.5	0.114	82	0.0001	0.073	<0.01	0.00022	<0.004	12.2	<0.002
03-Nov-09	12	500	520																						
10-Nov-09	13	500	435	0.0115	<0.01	12.5	11.4	<0.2	0.002	0.0205	<0.04	1.7	<0.0008	12.3	0.0001	0.4	0.084	74	0.00011	0.0777	<0.01	0.00021	0.006	8.74	<0.002
17-Nov-09	14	500	455																						
24-Nov-09	15	500	510	0.0115	<0.03	11.3	10.1	<0.5	<0.003	0.017	<0.1	1.2	<0.002	9.85	<0.0003	<0.5	0.068	87	<0.0001	0.0568	<0.03	0.0002	<0.01	8.04	<0.005
01-Dec-09	16	500	460																						
08-Dec-09	17	500	480	0.0553	<0.03	18.4	16.6	<0.5	<0.003	0.032	<0.1	1.8	<0.002	12.1	0.0004	<0.5	0.11	80	0.0002	0.108	<0.03	0.0009	<0.01	14.9	<0.005
15-Dec-09	18	500	470																						
22-Dec-09	19	500	470	0.033	<0.05	24	23.9	<1	<0.005	0.066	<0.2	2	<0.004	14.4	0.0006	2	0.155	133	0.0002	0.169	<0.05	0.004	<0.02	26.2	<0.01
29-Dec-09	20	500	465																						
05-Jan-10	21	500	420	0.095	<0.05	24	43.7	<1	<0.005	0.092	<0.2	1	<0.004	22	0.0017	<1	0.18	218	<0.0002	0.278	<0.05	0.0214	<0.02	70.8	<0.01
12-Jan-10	22	500	430																						
19-Jan-10	23	500	440	0.0946	<0.03	15.1	69.3	<0.5	0.008	0.067	<0.1	1	<0.002	25.3	0.0014	0.8	0.145	452	0.0002	0.309	<0.03	0.0294	<0.01	113	<0.005
26-Jan-10	24	500	435																						
02-Feb-10	25	500	450	0.0725	<0.03	13.2	41.9	<0.5	<0.003	0.054	<0.1	0.8	<0.002	26.8	0.0017	0.9	0.098	592	0.0002	0.266	<0.03	0.0284	0.019	129	<0.005
09-Feb-10	26	500	415																						
16-Feb-10	27	500	460	0.0238	<0.05	13	15.6	<1	<0.005	0.036	<0.2	<1	<0.004	34.8	0.0014	<1	0.052	380	<0.0002	0.205	<0.05	0.0164	<0.02	94.3	<0.01
23-Feb-10	28	500	485																						
02-Mar-10	29	500	395	0.0299	<0.05	18	9.22	<1	<0.005	0.065	0.274	<1	<0.004	28.9	0.0027	<1	0.05	692	<0.0002	0.22	<0.05	0.0179	0.049	120	<0.01
09-Mar-10	30	500	480																						
16-Mar-10	31	500	445	0.0177	<0.05	16	6.01	<1	<0.005	0.06	0.285	<5	<0.004	26.8	0.0027	<5	0.04	<1000	<0.0002	0.207	<0.05	0.0125	0.057	94.8	<0.01
23-Mar-10	32	500	485																						
30-Mar-10	33	500	430	0.0142	<0.05	15	4.73	<1	<0.005	0.047	0.51	<1	<0.004	20.2	0.0044	<1	0.044	665	<0.0002	0.203	<0.05	0.0117	0.051	76	<0.01
06-Apr-10	34	500	470																						
13-Apr-10	35	500	485	0.006	<0.01	9	2.78	<0.2	<0.001	0.0292	0.075	<1	<0.0008	18.6	0.0014	<1	0.031	329	0.00033	0.107	0.011	0.00609	0.037	37.7	<0.002
20-Apr-10	36	500	480																						
27-Apr-10	37	500	445	0.0052	<0.03	9	2.69	<0.5	<0.003	0.042	0.424	<3	<0.002	22.6	0.0038	<3	0.037	549	0.0001	0.153	<0.03	0.0078	0.043	40.4	<0.005
04-May-10	38	500	485																						
11-May-10	39	500	425	0.0057	<0.03	6	2.15	<0.5	<0.003	0.043	0.562	<3	<0.002	22.1	0.0039	<3	0.041	651	<0.0001	0.147	<0.03	0.0072	0.031	35.2	<0.005
18-May-10	40	500	405																						
25-May-10	41	500	435	0.0033	<0.03	5	1.85	<0.5	<0.003	0.039	0.471	<3	<0.002	18	0.0065	<3	0.038	531	0.0001	0.112	<0.03	0.007	0.032	23.7	<0.005
01-Jun-10	42	500	480																						
08-Jun-10	43	500	405	0.0054	<0.05	5	1.94	<1	<0.005	0.063	1.3	<5	<0.004	25.9	0.0066	<5	0.041	<1000	<0.0002	0.126	<0.05	0.0076	0.041	25.1	<0.01
15-Jun-10	44	500	445																						
22-Jun-10	45	500	430	0.0049	<0.03	<3	1.21	<0.5	<0.003	0.029	0.642	<3	<0.002	12.7	0.0078	<3	0.023	<500	0.0001	0.0699	<0.03	0.0045	0.02	13.5	<0.005
29-Jun-10	46	500	475																						
06-Jul-10	47	500	435	0.0014	<0.03	4	1.98	<0.5	<0.003	0.047	1.31	<3	<0.002	20.4	0.003	<3	0.042	643	<0.0001	0.104	<0.03	0.0065	0.03	18.8	<0.005
13-Jul-10	48	500	470																						
20-Jul-10	49	500	445	0.0013	<0.01	2	1.15	<0.2	<0.001	0.0404	0.918	<1	<0.0008	15.3	0.0019	<1	0.033	479	0.00007	0.0936	<0.01	0.0046	0.024	10.7	<0.002
27-Jul-10	50	500	460																						
03-Aug-10	51	500	425	0.0031	<0.01	1	0.709	<0.2	<0.001	0.031	0.872	<1	<0.0008	11	0.0027	<1	0.023	434	0.00013	0.0599	<0.01	0.00299	0.011	7.85	<0.002
10-Aug-10	52	500	435																						
17-Aug-10	53	500	440	0.00099	0.004	1	0.513	<0.05	0.0006	0.0202	0.804	<0.3	0.0002	8.84	0.00165	<0.3	0.0179	352	0.00006	0.0426	<0.003	0.00209	0.009	5.47	<0.0005
24-Aug-10	54	500	495																						
31-Aug-10	55	500	430	0.00055	<0.005	1	0.524	<0.1	<0.0005	0.0176	0.836	<0.5	<0.0004	6.45	0.00144	<0.5	0.0135	288	0.00005	0.0342	<0.005	0.00197	0.006	4.45	<0.001
07-Sep-10	56	500	430																						
14-Sep-10	57	500	445	0.0003	<0.01	1	0.591	<0.2	<0.001	0.0279	1.32	<1	<0.0008	7.66	0.0009	<1	0.014	313	0.00006	0.0408	0.023	0.00325	0.007	4.32	<0.002
21-Sep-10	58	500	465																						
28-Sep-10	59	500	455	0.0008	<0.01	1	0.60																		