



GEOCHEMICAL EVALUATION OF WASTE ROCK – HOLLINGER MINE

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GEOCHEMICAL EVALUATION OF WASTE ROCK – HOLLINGER MINE

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EXECUTIVE SUMMARY

A characterization study was completed for waste rock associated with the proposed open pit mining operations at the former Hollinger Mine in Timmins, ON. The investigation was focused on identifying and assessing potential environmental risks associated with waste rock from the proposed mining operation. Goldcorp collected and submitted over 80 diamond drill core samples for static testing, including metal content, Acid Base Accounting (ABA) and Synthetic Precipitate Leachate Procedure (SPLP) analyses. The samples were organized by rock type as identified by PGM geologists into groups including feldspar porphyry, mafic volcanics and various sedimentary lithologies.

The ABA results suggest that acid generation is not likely to be an issue with the waste rock generated from the proposed Hollinger Open Pit. There appears to be sufficient useful NP in all rock types to prevent acidification. Metal content analyses suggest that the key constituents of potential concern include antimony, arsenic and zinc. However, results of the SPLP tests suggest that most constituents of potential concern (COPC) appear to be relatively immobile and leachate concentrations were typically below laboratory detection limits. Arsenic and zinc have the highest leachate concentrations relative to water quality objectives and these results suggest further assessment of these COPCs.

Temporal trends in sulphate loadings from humidity cell testing on the argillite sediments are indicative of both flushing of soluble products from the rock and longer term oxidative release. The loadings of cobalt, molybdenum, selenium and zinc in the argillite sediments appear to be correlated with sulphate concentrations, and are indicative of rinsing of the rock (selenium and molybdenum) and longer term release due to oxidation (cobalt and zinc). Steady state loadings of cobalt and zinc from the argillite sediments averages about 42 and 520 kg/Mt/a, respectively, based on humidity cells with no adjustment for field conditions.

Arsenic loadings from the feldspar porphyries are indicative of flushing of residual arsenic from the surface of the rock. However, peak loading rates ranged between 2,600 and 4,680 kg/Mt/a for the two duplicate samples. The elevated arsenic levels are consistent with arsenic observations in tailings associated with the Hollinger and McIntyre mines.

Further assessment is required for the argillite sediments during the Hollinger Feasibility stage and should include evaluation of management options for the waste materials, including the potential for segregation of the various wastes, as part of the feasibility study. Volume estimates of each potential waste type should be completed to allow for estimation of the total loadings from the waste and to assist with the assessment of potential segregation strategies.

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1.0 INTRODUCTION

Goldcorp Canada Ltd. Porcupine Gold Mines (PGM) is currently evaluating the possibility of resuming mining operations at the former Hollinger Mine in Timmins, ON. PGM has been actively exploring the site over the past few years and has collected a substantial amount of diamond drill core. As part of the pre-feasibility study, PGM requires an assessment of the potential environmental issues related to drainage from potential waste rock associated with the open pit mine and implications for managing the waste rock.

EcoMetrix Incorporated (EcoMetrix) was retained by PGM to provide a preliminary characterization of the waste rock inventory for the proposed Hollinger Mine. The results of the investigation are intended to provide guidance for mitigation of the potential environmental issues related to drainage from waste rock, as appropriate, through classification and management of each of the waste rock types during the mining operation.

The overall objective of the program is to provide assistance with appropriate classification and management of each of the waste rock types during the mining operation. Specifically, the program was focused on identifying and assessing potential environmental concerns from waste rock from the proposed open pit mine. Once the rock types are classified in terms of potential environmental behavior, operational monitoring and management strategies will be required to provide cost effective and safe storage of waste rock for the long term.

This program involved characterization of the rock and assessment of the environmental implications of the various rock types. The data collected to date indicates that much of the waste rock will likely represent a low risk for environmental effects. However, there is potential for some of the waste rock to represent a higher risk to drainage quality. The results of the current testing assist in differentiating between the majority of low risk material and the minority of higher risk materials, and also assist in determining cost effective mitigation strategies for these higher risk rock types.

2.0 WASTE CHARACTERIZATION AND CLASSIFICATION

In 2006 a drilling program was initiated at the Hollinger Mine and carried out by PGM. Since then, PGM has submitted over 80 core samples, collected as approximately 1m sections, for static testing, including metal content, Acid Base Accounting (ABA) and Synthetic Precipitate Leachate Procedure (SPLP with 20:1 water:solids ratio).

The samples are organized by rock type identified by PGM geologists into groups including feldspar porphyries (F), mafic volcanics (VM) and various sedimentary lithologies (SS).

Results from the metal content analysis are summarized as minimum, maximum and geometric mean values in Table 2.1 and are compared to average crustal abundances for each potential constituent of concern. Results from the ABA and SPLP testing are summarized in Tables 2.2 and 2.3, respectively. Complete results as analyzed by SGS Lakefield Research Limited (SGS Lakefield) and provided by PGM are presented in Appendix 1.

Review of the ABA results (Table 2.2) suggest that the majority of rock samples will not be at risk for acid generation, with only 4 of the 80 samples (5%) categorized as possibly acid generating (Sobek-NP/AP ratios less than 2) based on criteria provided in BC Draft Guidelines (Price, 1997). An additional 4 samples exhibited ratios between 2 and 4, suggesting low potential for acid generation (Figure 2.1). All but one of these samples with low NP/AP ratios are of mafic volcanic lithology, and the other sample is a feldspar porphyry sample.

Based on the samples to date, there appears to be sufficient useful NP to prevent acidification, therefore, acid generation is not likely to be an issue with the waste rock generated from the proposed Hollinger Open Pit. This conclusion is further supported by data available from historical and current mining operations in the Timmins area (McIntyre, Hollinger, Pamour) for which there are abundant data for the historic tailings on surface in that area.

In general, carbonate NP values, which are calculated from the carbonate content of the rock material, are slightly greater than the Sobek NP values which are determined through laboratory titrations (Figure 2.2). This suggests that a small portion of the carbonate minerals either react slowly or may not provide any net neutralization capacity, as would be the case with iron or manganese carbonate.

Although the waste rock is not expected to pose an acid generation problem, assessment of metal leaching at neutral pH required consideration for the assessment and development of waste rock management strategies. The geometric mean of the arsenic content of the potential waste rock is 12.6 mg/kg, with antimony and zinc contents with geometric means of 0.4 and 148 mg/kg, respectively (Table 2.1). The geometric mean is 48 mg/kg for nickel

and 53 mg/kg for copper. However, results of the SPLP tests (Table 2.3) suggest that most parameters appear to be relatively immobile as leachate concentrations were typically low and below laboratory detection limits, although the low concentrations may be a result of dilution due to the high water to solids ratio.

Based on screening criteria of 10x the average crustal abundance and SPLP testing, the results suggest that the key constituents of potential concern include antimony, arsenic and zinc. It is important to note that although the concentration of molybdenum in the solids is low (geometric mean=0.35 mg/kg), molybdenum was easily leached from some samples during the SPLP testing. The concentration of molybdenum leached during the tests ranged between 0.002 and 278 mg/kg. In addition, previous evaluations of mine tailings from the Hollinger area (McIntyre, former Hollinger Mine) suggest that leaching of cadmium, cobalt, copper, nickel, lead and selenium may also represent potential environmental risks. Although tailings geochemistry may be more representative of ore materials, the results from the historic mines provide an indication of constituents of potential concern that warrant further scrutiny.

3.0 LABORATORY TESTING

As part of the pre-feasibility study for resuming mining operations at the Hollinger Mine, PGM requires an assessment of the potential environmental issues related to drainage from waste rock associated with the open pit mine. Characteristics of the waste rock have previously been investigated by PGM using ABA and SPLP testing, as described above. In order to further evaluate the waste rock at the Hollinger Mine, EcoMetrix completed laboratory studies in order to assess the leachability of metals from potential waste rock.

3.1 Sample Selection

Crushed rock samples from the 80 core segments used for the metals, ABA and SPLP analyses were delivered to EcoMetrix and divided into three composites, representing the three different rock types, feldspar porphyry (19 core samples), mafic volcanics (55 core samples) and argillite sediments (8 core samples). Each composite sample comprised of equal amounts of each core segment to create a 4kg sample. Two 1kg sub-samples of each composite were used for the humidity cell testing with the remaining composite material archived for further analysis, if required.

3.2 Humidity Cell Test Methods

The modified humidity cell test procedure involved weekly flushing and collection of leachate for analysis for the duplicate composite rock samples representing feldspar porphyries (F-1 and F-2), mafic volcanics (VM-1 and VM-2) and argillite sediments (SS-1 and SS-2). Approximately 1 kg (dry weight) of the crushed rock material was placed into the top portion of a high density polyethylene (HDPE) funnel (Figure 3.1). A layer of Nitex screen between two sheets of Whatman filter paper was placed in the bottom of the funnel, prior to rock addition, in order to retain the rock, while allowing for water to filter through. Each week, distilled water was poured over the rock and allowed to gravity drain into dedicated collection flasks. Samples were taken from the collection flasks and the conductivity and pH were measured immediately after sample collection. After sampling, the funnels were loosely covered with cellophane to prevent excessive evaporation and left undisturbed until the next sampling event. Leachate samples for metals analysis were filtered using (45 µm), acidified (nitric acid to pH < 2) and stored at 4 °C prior to submission for analysis. Samples collected for alkalinity/acidity were filtered and stored at 4°C prior to analysis. All samples were submitted to ALS Environmental Laboratories (ALS) in Mississauga, ON for analysis.

3.3 Humidity Cell Test Results

The results for the humidity cell test are presented in Figure 3.2. As the methods used for the humidity cell tests are consistent over time, the time trends for the loading rates of individual COCs are similar to the trends for concentrations, thus, loading rates are

presented as mg-metal/kg-tailings/week. Complete results of the humidity cell tests are provided in Appendix 2.

Although fluctuations were observed in the weekly pH measurements, the pH values of the leachate from all the samples generally ranged between 6.5 and 8.5. Some exceptions with respect to the general pH range existed during the initial stages of testing. Sample SS-2 exhibited an initial leachate pH of 6.2 on the first day of testing, while samples F-1, F-2 and VM-2 had pH values of between 8.5 and 9.0 on the first sampling event (Day 0).

Concentrations of antimony, copper, cadmium, nickel and lead in the humidity cell leachates were generally below detection limits for all samples over the course of the testing, and therefore are not discussed further in this section of the report.

The highest arsenic loading trends were observed in the feldspar porphyry samples, F-1 and F-2 (Figure 3.2), with maximum loadings of 0.092 and 0.05 mg/kg/wk, respectively, or between 2,600 and 4,680 Kg/Mt/a. All other samples had arsenic loadings less than 0.02 mg/kg/wk, with either a steady or slightly decreasing trend with time, with the exception of VM-2, which appeared to have slightly increasing trend during the first 15 weeks before exhibiting a slight decrease after 15 weeks.

Loadings of cobalt, molybdenum and selenium were generally below detection (0.0005, 0.001 and 0.005 mg/L, respectively) in all of the feldspar porphyry and mafic volcanic samples. However, concentrations were detected in the argillite sediment samples with cobalt loadings ranging between <0.0005 and 0.0016 mg/kg/wk and with no consistent trend over time. Concentrations of molybdenum were highest in the initial flushing of the humidity cells, with loadings of 0.011 and 0.007 mg/kg/wk for the SS-1 and SS-2 samples, respectively. Maximum selenium loadings of approximately 0.021 and 0.018 mg/kg/wk were observed within a few weeks of rinsing and decreased with further testing.

The loadings of zinc during the beginning of testing were below or near detection limits for the feldspar porphyry and mafic volcanic samples (F-1, F-2, VM-1 and VM-2). However, after about 15 weeks of testing, spikes in zinc loadings were observed, although the overall loading of the samples generally remained below 0.005 mg/kg/wk. Zinc loadings in the SS-1 and SS-2 samples exhibited a general increasing trend, with maximum loadings of about 0.017 and 0.012 mg/kg/wk, respectively.

Sulphate loadings were relatively constant and below 20 mg/kg/wk for the feldspar porphyry and mafic volcanic samples, with the exception of sample F-2 which exhibited increases after 14 weeks of testing (Figure 3.2). The argillite sediment samples had sulphate loadings ranging between 27 and 111 mg/kg/wk for sample SS-1 and 24 and 75 for sample SS-2. In general, sulphate loadings show an overall decreasing trend with time in the sediment samples.

4.0 ENVIRONMENTAL IMPLICATIONS

The humidity cell testing was completed to provide a screening evaluation for any potential environmental issues related to drainage from the waste rock arising from the proposed Hollinger Mine and was not corrected for field conditions. The investigation was intended to allow for identification of any additional screening of COCs and/or rock types that could be completed as part of the feasibility program for the proposed mine should results of this study suggest that environmental effects were anticipated.

The results of Humidity Cell testing in addition to the ABA results indicate that the potential risk for acid generation is low if rock is stored in large stockpiles on surface. All samples exhibited neutral pH values in the humidity cell leachate, providing no indication that the samples could go acidic during the test period. However, sulphate loadings were steady around 30 mg/kg/wk for the argillite sediments by the end of the testing period. The initial loading of sulphate is likely a result of flushing of sulphate contained on the rock as a result of oxidation during sample collection and processing (crushing) prior to testing. However, the constant loadings at the end of the testing are an indication of longer-term oxidation and suggest that sulphate is being produced and that sulphide minerals will be subject to ongoing oxidation. The sulphate loadings also suggest that other metals may be subject to ongoing release during oxidation.

Loadings of cobalt, molybdenum, selenium and zinc in the argillite sediments correlate with sulphate release, and represent both flushing of these constituents from the rock (selenium and molybdenum) and longer term release due to oxidation (cobalt and zinc). Steady-state loadings from the argillite sediment samples averaged around 0.0008 and 0.01 mg/kg/wk for cobalt and zinc, respectively, or about 42 and 520 kg/Mt/a, respectively.

Sulphate loadings from one of the two duplicate feldspar samples exhibited increases after 14 weeks, although the second duplicate sample had not yet exhibited this increasing trend in concentration at week 20. The observed increase suggests that longer-term oxidation may also be occurring for the feldspar material. However, there were no correlated metal releases observed with the increased sulphate release.

The observed trend in arsenic loadings for the feldspar material is consistent with flushing of soluble arsenic contained on the rock as a result of oxidation during sample collection and processing. In addition, the lack of correlation with sulphate in the same sample cells suggests that these concentrations have not resulted from oxidative leaching. None-the-less, peak arsenic loadings during the initial rinsing of the waste may represent an environmental concern, and should be re-assessed after waste inventories and water flow balances are better defined.

The metal loadings observed for the argillite sediments indicates a potential risk and suggests that further assessment is warranted in the feasibility study for the site to evaluate

the management options for waste disposal. As part of the feasibility stage, an assessment of grade control should be completed, including screening of blast hole cuttings to allow for material identification and potential separation during drilling of potential metal leaching material.

5.0 SHAFT WATER FROM THE EXISTING HOLLINGER UNDERGROUND MINE

Concern for the water quality in the Hollinger shaft was expressed by Goldcorp personnel after excessive corrosion of the water pump was noted in 2008. The pump and associated steel parts required replacement after only one year of operation compared to the ongoing operation of a similar pump in the McIntyre shaft. Goldcorp requested that EcoMetrix assess the conditions that may be responsible for the conditions related to the pump corrosion in the Hollinger shaft. Samples of sludge were collected from the pump when it was removed for maintenance and sent for chemical analysis. Water samples from the shaft were also collected and analyzed.

The sludge sample contained approximately 39% iron and 9% sulphur (Table 5.1). The sulphur is the key to understanding the corrosion issue. It appears that the iron is corroded by the formation of FeS rather than iron oxide. The FeS is consistent with the appearance of the “black” coloured sludge.

The water samples support this hypothesis (Table 5.2). The water contains sulphate (600 to 2,700 mg/L) and therefore has a source of sulphur. Only one sample was analyzed for dissolved sulphide and that sample exhibited a concentration of 0.03 mg/L, a relatively high value for sulphide in water. In addition, the water had a neutral pH (7.4) and elevated alkalinity (460 to 580 mg/L and CaCO₃). The neutral pH suggests that the water is not corrosive due to acidic conditions. The high alkalinity is consistent with sulphate reduction or the production of sulphide (dissolved or gas) during reactions between sulphate and some organic source.

It is understood that the current flow rate from the Hollinger shaft is relatively low (approximately 1,000 m³/d). This means that there is a long residence time in the shaft and adequate time for bacterial activity to mediate the sulphate reduction reactions. However, if mine dewatering is planned in the future, then greater pumping rates are anticipated and shorter residence times are expected. It is likely that greater pumping will not allow as much sulphate reduction and the potential for corrosion by this mechanism will decline. If small pumping rates are expected to continue, then stainless steel pumps or other mitigation (such as aeration of shaft water) should be considered.

6.0 CONCLUSIONS

The following conclusions are based on the results of this investigation:

- ABA results indicate that the majority of the potential waste rock material is not likely to produce acid, with only 8 of the 80 samples having NP/AP ratios less than 4 and all samples exhibiting NP/AP values greater than 1;
- SPLP testing suggests that most parameters appear to be relatively immobile as leachate concentrations were typically low and below laboratory detection limits, although the low concentrations may be a result of dilution due to the high 20:1 water to solids ratio. Arsenic and zinc exhibited the highest leachate concentrations relative to water quality objectives;
- Constituents of Primary Concern include arsenic, cobalt, molybdenum, selenium and zinc;
- Temporal trends in sulphate loadings from humidity cell testing on the argillite sediments are indicative of both flushing from the rock and longer term oxidation;
- The loadings of cobalt, molybdenum, selenium and zinc in the argillite sediments appear to be correlated with sulphate concentrations, and are indicative of rinsing of the rock (selenium and molybdenum) and longer term release due to oxidation (cobalt and zinc);
- Steady state loadings of cobalt and zinc from the argillite sediments averages about 42 and 520 kg/Mt/a, respectively, based on humidity cells with no adjustment for field conditions;
- Arsenic loadings from the feldspar porphyries are indicative of flushing of residual arsenic from the surface of the rock. However, peak concentrations ranged between 2,600 and 4,680 kg/Mt/a for the two duplicate samples. The elevated arsenic levels are consistent with arsenic observations in tailings associated with the Hollinger and McIntyre mines.
- Further assessment is required for the argillite sediments during the Hollinger Feasibility stage and should include evaluation of management options for the waste material. In addition, segregation should be considered for various wastes as part of the feasibility study; and
- Volume estimates of each potential waste type should be completed to allow for estimation of the total loadings from the waste.

7.0 REFERENCES

Price, W.A. 1997. Draft Guidelines and Recommended Methods for the Prediction of Metal Leaching and Acid Rock Drainage at Minesites in British Columbia. B.C. Ministry of Employment and Investment (note: Ministry of Employment and Investment was the former home of the present Ministry of Energy and Mines).

Table 2.1
Summary of Metal Contents in Waste Rock

Parameter	Average Crustal Abundance (mg/kg) ¹	Minimum (mg/kg)	Maximum (mg/kg)	Geometric Mean (mg/kg) _{2,3}
<i>Felspar Porphyries (n=19)</i>				
Antimony	0.20	0.20	2.90	0.66
Arsenic	1	<2	91	15.3
Cobalt	29	4.30	91.0	13.6
Copper	75	1.80	96.0	10.4
Iron	24,830	15,000	65,000	25,455
Lead	8	2.50	178	16.6
Molybdenum	1	0.08	24.0	0.44
Nickel	105	7.20	91.0	26.4
Selenium	0.05	<1	2	1
Zinc	80	28	2500	192
<i>Mafic Volcanics (n=55)</i>				
Antimony	0.20	<0.1	1.30	0.28
Arsenic	1	<2	130	11.3
Cobalt	29	18.0	100	38.7
Copper	75	27.0	550	80.6
Iron	24,830	39,000	147,000	68,945
Lead	8	0.20	14	2.0
Molybdenum	1	<0.05	12	0.30
Nickel	105	13.0	300	60.1
Selenium	0.05	<1	7	2
Zinc	80	37	1800	112
<i>Sedimentary Lithologies (n=8)</i>				
Antimony	0.20	0.60	2.70	1.07
Arsenic	1	20	96	41.3
Cobalt	29	32.0	60.0	39.2
Copper	75	77	540	234
Iron	24,830	30,000	108,000	67,296
Lead	8	3.90	170	11.3
Molybdenum	1	0.42	10	1.76
Nickel	105	56	90	72.3
Selenium	0.05	2	6	3
Zinc	80	110	2900	978

Notes:

- 1 - From Faure (1998) Geochemistry of Natural Waters. Prentice-Hall, Table A.10 pg. 513
- 2 - Assumes a value equivalent to detection limit for values in data set reported less than detection
- 3 - Bold values are more than 10 times average crustal abundance

Table 2.2
Summary of Acid Base Accounting Results for Waste Rock

Parameter	Units	Minimum	Maximum	Geometric Mean
<i>Feldspar Porphyries (n=19)</i>				
pH	---	8.40	9.35	8.81
Acid Generating Potential	kg CaCO ₃ /t	0.31	69.6	5.0
Sobek Neutralization Potential	kg CaCO ₃ /t	48	284	167
Carbonate Neutralization Potential	kg CaCO ₃ /t	64	331	206
Sobek NP/AP	---	1.70	771	33.0
Carbonate NP/AP	---	3.50	927	40.8
Sulphide Sulphur	%	0.01	2.23	0.16
Total Sulphur	%	0.06	2.72	0.24
Sulphate Sulphur	%	<0.4	<0.4	<0.4
CO ₂	%	2.94	19.6	10.8
<i>Mafic Volcanics (n=55)</i>				
pH	---	8.44	9.86	9.21
Acid Generating Potential	kg CaCO ₃ /t	0.31	65.3	3.82
Sobek Neutralization Potential	kg CaCO ₃ /t	58	331	139
Carbonate Neutralization Potential	kg CaCO ₃ /t	86	394	165
Sobek NP/AP	---	1.30	1067	36.5
Carbonate NP/AP	---	1.93	1272	43.3
Sulphide Sulphur	%	0.01	2.09	0.12
Total Sulphur	%	0.01	2.75	0.20
Sulphate Sulphur	%	<0.4	<0.4	<0.4
CO ₂	%	4.33	21.7	8.58
<i>Sedimentary Lithologies (n=8)</i>				
pH	---	8.29	9.21	8.75
Acid Generating Potential	kg CaCO ₃ /t	0.31	27	3.1
Sobek Neutralization Potential	kg CaCO ₃ /t	85	263	162
Carbonate Neutralization Potential	kg CaCO ₃ /t	122	310	212
Sobek NP/AP	---	5.90	850	52.7
Carbonate NP/AP	---	9.01	1000	68.9
Sulphide Sulphur	%	0.01	0.85	0.10
Total Sulphur	%	0.09	1.2	0.31
Sulphate Sulphur	%	<0.4	<0.4	<0.4
CO ₂	%	5.71	17.2	10.7

Table 2.3
Summary of Synthetic Precipitate Leachate Procedure (SPLP) Testing Results for Waste Rock

Parameter	Units	PWQO	Minimum	Maximum	Geometric Mean ¹	Ratio (Geomean/PWQO) ²
Feldspar Porphyries						
Antimony	mg/L	0.02	0.0004	0.0042	0.002	0.1
Arsenic	mg/L	0.005	0.002	0.070	0.012	2.5
Cobalt	mg/L	0.009	0.00036	0.000360	0.00009	0.01
Copper	mg/L	0.001	0.0005	0.0013	0.0007	0.7
Iron	mg/L	0.3	<0.01	0.64	0.06	0.2
Lead	mg/L	0.005	0.00039	0.00566	0.0011	0.2
Molybdenum	mg/L	0.04	0.00019	13.90	0.003	0.1
Nickel	mg/L	0.025	<0.00007	0.0005	0.0005	0.02
Selenium	mg/L	0.1	<0.0003	<0.001	0.0008	0.008
Zinc	mg/L	0.02	0.003	0.273	0.096	4.8
Mafic Volcanics						
Antimony	mg/L	0.02	0.0002	0.0044	0.002	0.1
Arsenic	mg/L	0.005	<0.0002	0.0173	0.001	0.2
Cobalt	mg/L	0.009	<0.00001	0.00059	0.00002	0.003
Copper	mg/L	0.001	<0.0001	0.0016	0.0004	0.4
Iron	mg/L	0.3	<0.01	1.40	0.02	0.1
Lead	mg/L	0.005	<0.0002	0.0022	0.00054	0.5
Molybdenum	mg/L	0.04	0.0001	9.67	0.40	9.9
Nickel	mg/L	0.025	<0.00002	0.00100	0.0001	0.005
Selenium	mg/L	0.1	<0.0003	0.0010	0.0005	0.005
Zinc	mg/L	0.02	0.003	0.252	0.057	2.8
Sedimentary Lithologies						
Antimony	mg/L	0.02	0.0025	0.0050	0.003	0.2
Arsenic	mg/L	0.005	<0.0005	0.0486	0.003	0.6
Cobalt	mg/L	0.009	<0.00001	0.00023	0.00004	0.004
Copper	mg/L	0.001	0.0002	0.0024	0.0007	0.7
Iron	mg/L	0.3	<0.01	0.18	0.03	0.1
Lead	mg/L	0.005	0.00035	0.00520	0.0018	0.4
Molybdenum	mg/L	0.04	0.0003	9.24	1.86	46.5
Nickel	mg/L	0.025	<0.00002	0.00080	0.0001	0.005
Selenium	mg/L	0.1	<0.0003	0.0010	0.0004	0.004
Zinc	mg/L	0.02	0.006	0.181	0.066	3.3

Notes:

1 - Assumes a value equivalent to detection limit for values in data set reported less than detection

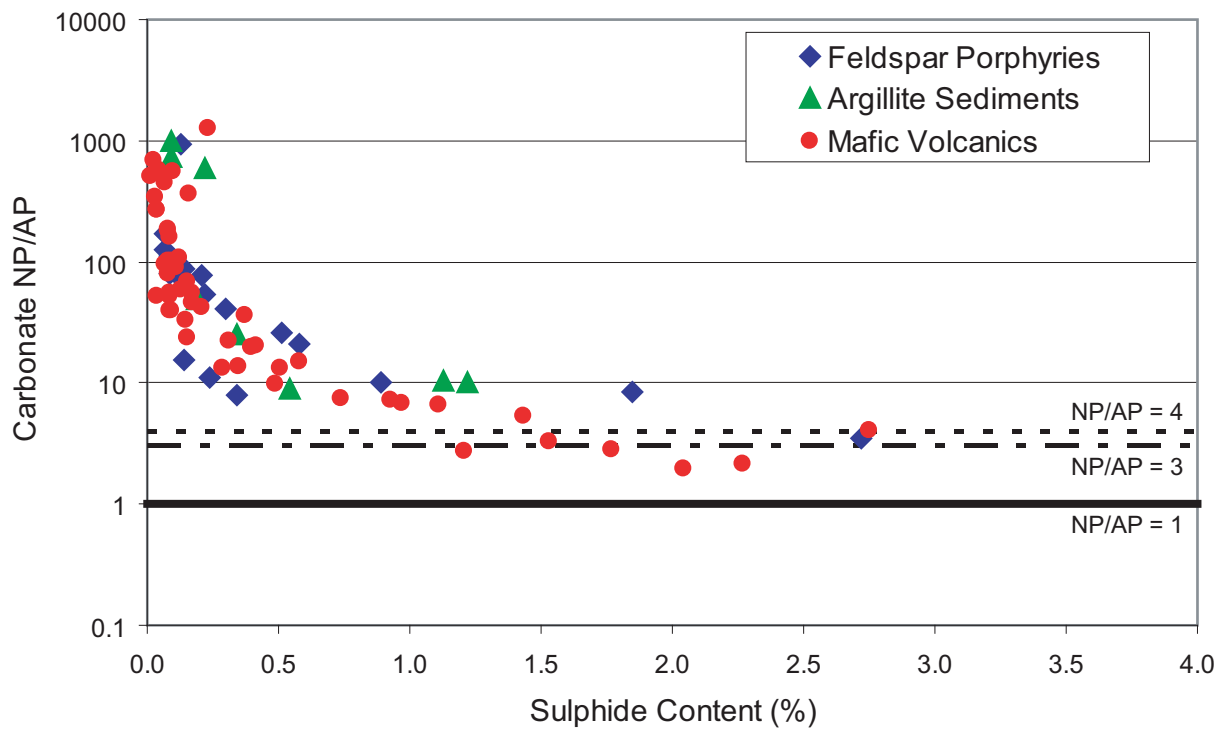
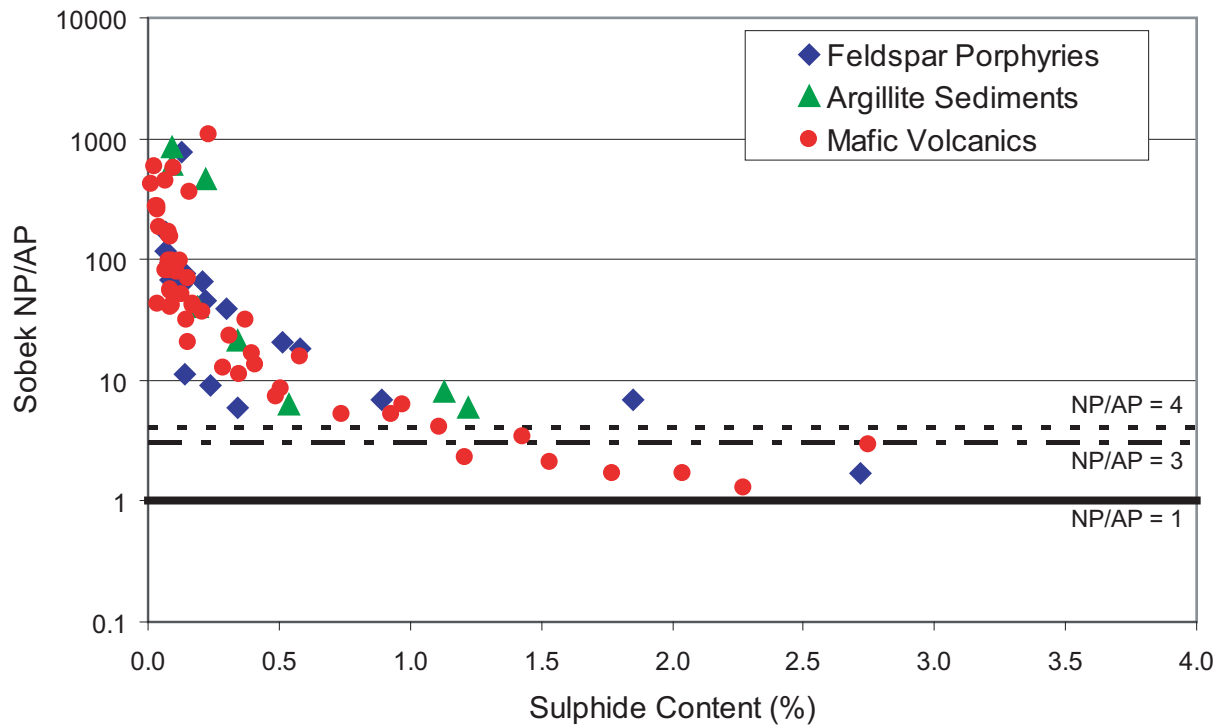
2 - Ratios of leachate concentration to Provincial Water Quality Objectives (PWQO) shown for screening index only - there are no regulatory limits for SPLP results

Table 5.1
Summary of Hollinger Shaft Sludge Chemistry

Sample ID		Sludge
Sample Date		3-Mar-08
Antimony	mg/kg	<10
Arsenic	mg/kg	710
Cobalt	mg/kg	850
Copper	mg/kg	630
Iron	%	39
Molybdenum	mg/kg	41
Nickel	mg/kg	700
Zinc	mg/kg	440
Sulphur	%	8.98

**Table 5.2
Summary of Hollinger Shaft Water Chemistry**

Sample Location Sample Date	Hollinger Shaft Tank 29-Jan-08	Hollinger Shaft Tank 5-Feb-08	Hollinger Shaft Tank 25-Feb-08	Hollinger Shaft Tank 3-Mar-08	Hollinger Shaft 7-Apr-08
Lab pH	7.25	7.33	7.42	7.32	7.42
Acidity (pH 8.3)	89	66.9	61.6	52.4	58.9
Total Alkalinity	584	460	467	455	459
Sulphate	2721	580	570	591	624
Total Sulphide				0.03	
TOTAL METALS					
Antimony	<0.003	<0.003	<0.003	<0.003	
Arsenic	0.0061	0.0551	0.0525	0.0653	0.0633
Cobalt	<0.0005	0.0163	0.0111	0.0168	
Copper	<0.0005	<0.0005	<0.0005	0.0008	<0.0005
Iron	26.4	12.2	11.3	11.8	10.1
Molybdenum	0.0074	<0.002	<0.002	<0.002	
Nickel	0.0021	<0.0005	0.0047	0.0057	0.0036
Zinc	0.0933	0.0224	0.0172	0.0157	0.0227
DISSOLVED METALS					
Antimony	<0.003	<0.003	<0.003	<0.003	
Arsenic	0.0032	0.0495	0.0157	0.0144	
Cobalt	<0.0005	0.0161	0.0164	0.0158	
Copper	0.0015	<0.0005	<0.0005	<0.0005	
Iron	22.5	10.6	1	0.0079	
Molybdenum	0.006	<0.002	<0.002	<0.002	
Nickel	0.0041	<0.0005	0.0049	0.0072	
Zinc	0.0722	0.005	0.0026	0.0054	



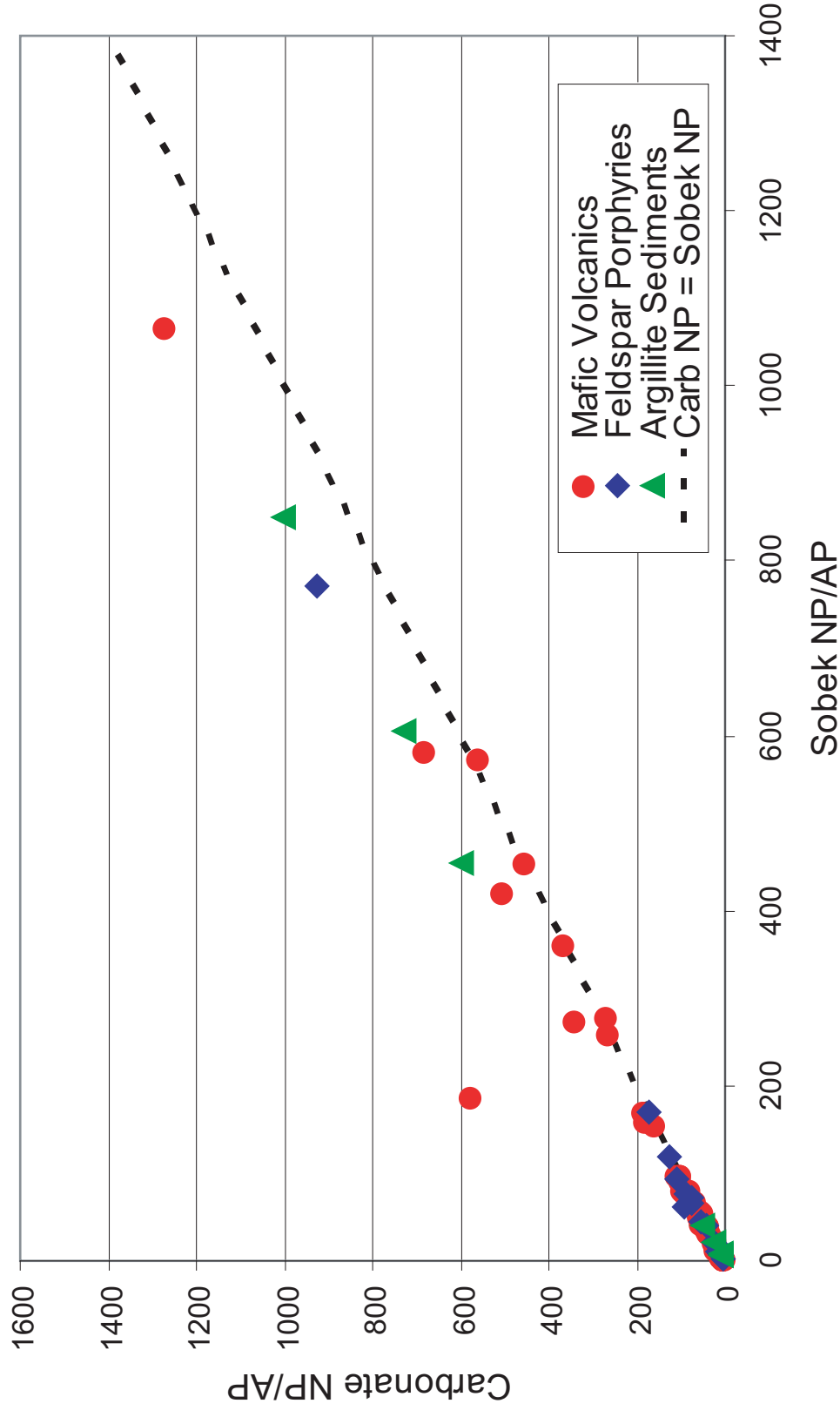
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Distribution of Sobek and Carbonate NP/AP with Sulphide Content in Hollinger Waste Rock Samples

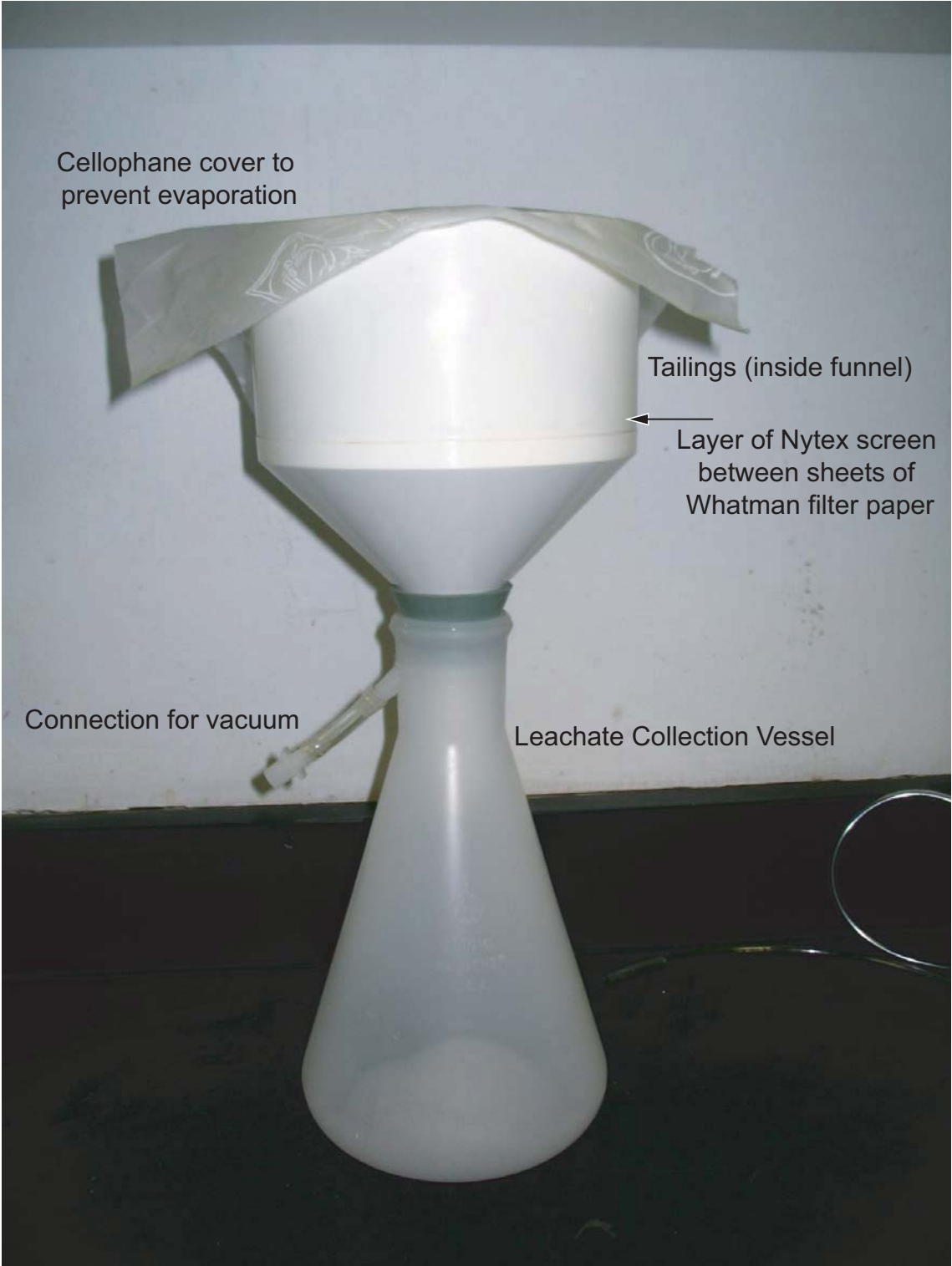


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Figure 2.1



Goldcorp Canada Ltd. - Porcupine Gold Mines	
Comparison of Sobek and Carbonate Neutralization Potentials	
	April 2008
	Figure 2.2



Cellophane cover to prevent evaporation

Tailings (inside funnel)

Layer of Nytex screen between sheets of Whatman filter paper

Connection for vacuum

Leachate Collection Vessel

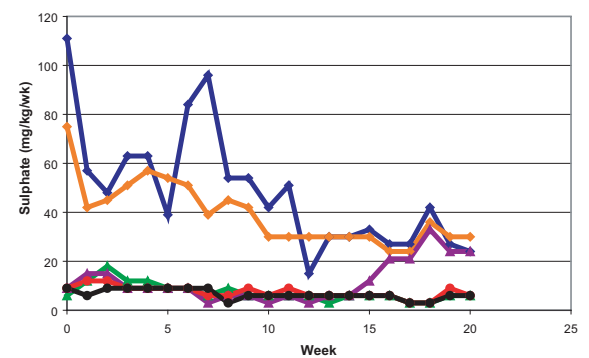
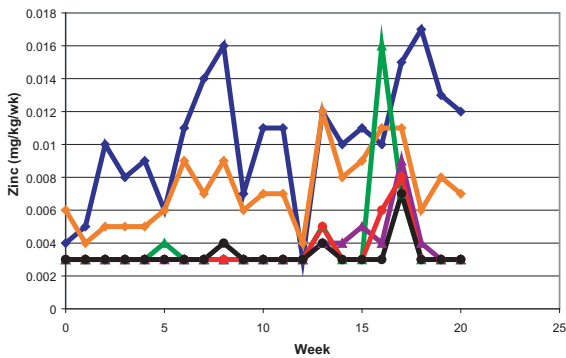
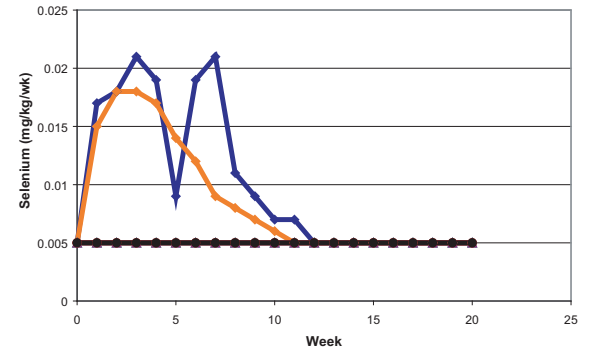
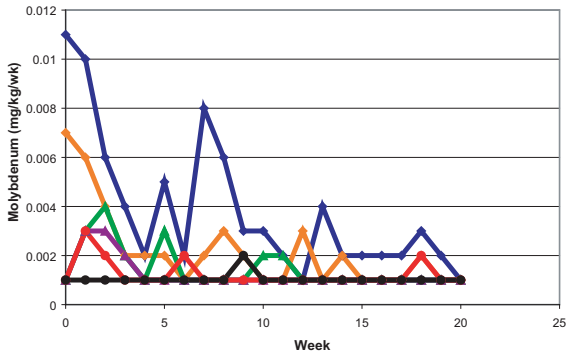
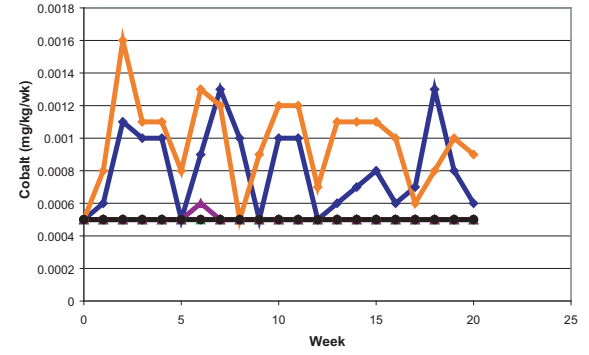
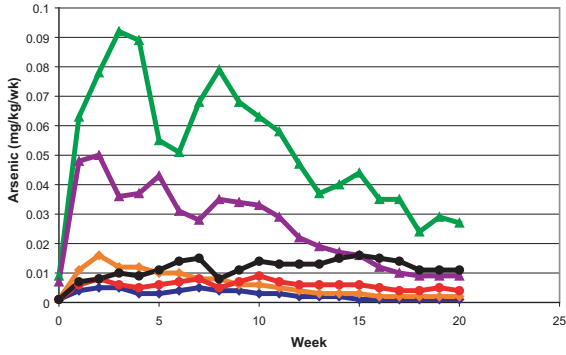
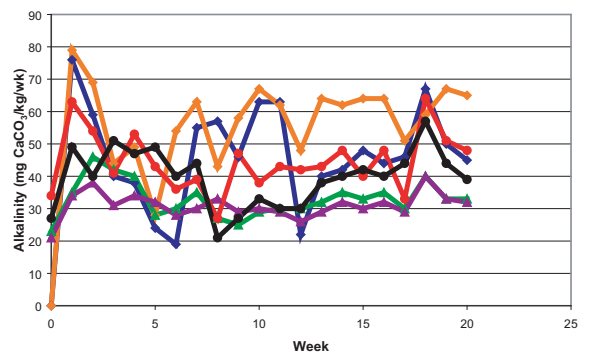
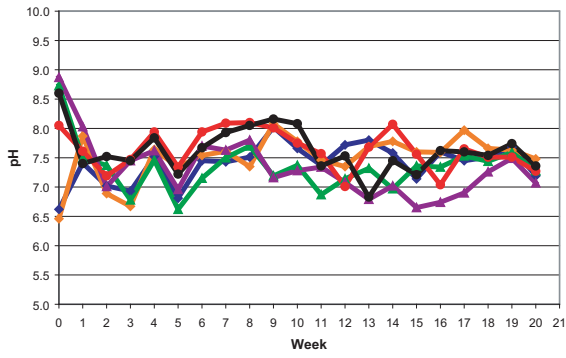
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Modified Humidity Test Cell Set-up



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Figure 3.1



- ◆ SS-1
- ▲ F-1
- VM-1
- ▲ SS-2
- ▲ F-2
- VM-2

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Summary of Humidity Cell Testing Results for Selected Constituents of Concern



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Figure 3.2



APPENDIX 1

Compilation of Metal, ABA and SPLP Data

Appendix 1
Compilation of Metals, ABA and SPLP Data

Sample ID Depth	E414620		E414688		E416507		E430013		E446847		E446335		E446336		E446337		E446345		E446366		E446363		E446354		E446355		E446356		E446357		E446358		E446359					
	From	To	FP	FP	FP	FP	FP	FP	FP	FP	FP	FP	FP	FP	FP	FP	FP	FP	FP	FP	FP	FP	FP	FP	FP	FP	FP	FP	FP	FP	FP	FP	FP	FP	FP			
Lithology																																						
Solids Content																																						
Silver (Ag)	ug/g		0.37	0.23	0.30	0.30	0.30	0.30	0.47	0.35	0.35	0.36	0.47	0.36	0.47	0.35	0.35	2.3	0.89	0.89	0.59	0.59	0.45	0.45	0.41	0.41	0.70	0.70	0.64	0.64	0.81	0.81	0.44	0.44				
Aluminum (Al)	ug/g	88000	89000	49000	73000	73000	84000	84000	67000	77000	77000	76000	67000	76000	76000	77000	77000	72000	79000	79000	76000	76000	75000	75000	73000	73000	81000	81000	81000	81000	70000	70000	78000	78000				
Arsenic (As)	ug/g	91	16	13	11	11	30	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	19	55	55	16	16	28	28	31	31	12	12	24	24	23	23	10	10				
Barium (Ba)	ug/g	300	290	220	400	400	250	160	160	340	340	320	160	320	320	340	340	280	370	370	600	600	560	560	390	390	700	700	190	190	450	450	280	280				
Beryllium (Be)	ug/g	0.8	0.9	0.6	0.9	0.9	0.8	0.6	0.6	0.9	0.9	0.8	0.6	0.8	0.8	0.9	0.9	0.9	0.9	0.9	0.8	0.8	0.8	0.8	0.9	0.9	1.0	1.0	1.1	1.1	0.5	0.5	1.1	1.1				
Boron (B)	ug/g	17	9	63	10	10	7	5	5	13	13	9	5	9	9	13	13	9	28	28	3	3	5	5	11	11	8	8	7	7	7	7	8	8				
Bismuth (Bi)	ug/g	0.11	<0.06	0.26	<0.06	<0.06	0.29	<0.06	0.17	0.08	0.08	<0.06	0.17	<0.06	<0.06	0.08	0.08	0.20	0.66	0.66	0.28	0.28	0.10	0.10	0.69	0.69	0.07	0.07	<0.06	<0.06	0.41	0.41	0.08	0.08				
Calcium (Ca)	ug/g	12000	14000	19000	34000	34000	22000	22000	54000	21000	21000	27000	54000	27000	27000	21000	21000	24000	16000	19000	19000	19000	25000	25000	20000	20000	27000	27000	18000	18000	31000	31000	22000	22000				
Cadmium (Cd)	ug/g	0.43	0.17	0.10	0.25	0.25	0.24	0.24	0.32	0.18	0.18	0.51	0.32	0.32	0.18	0.18	0.40	0.40	0.60	0.60	1.3	1.3	1.1	1.1	0.55	0.55	0.63	0.63	1.7	1.7	1.9	1.9	5.5	5.5				
Cobalt (Co)	ug/g	40	5.6	91	8.6	8.6	6.1	7.2	25	4.8	4.8	7.2	25	7.2	7.2	4.8	4.3	4.3	10	10	11	11	11	11	17	17	13	13	14	14	44	44	25	25				
Chromium (Cr)	ug/g	60	13	8.4	17	17	11	12	47	13	13	12	47	12	13	13	9.0	79	79	23	23	37	37	94	94	31	31	41	41	86	86	20	20					
Copper (Cu)	ug/g	12	4.8	2.8	7.4	7.4	6.0	2.9	96	1.8	1.8	2.9	96	2.9	1.8	1.8	3.3	14	14	9.6	9.6	11	11	17	17	9.8	9.8	18	18	83	83	12	12					
Iron (Fe)	ug/g	18000	18000	16000	24000	24000	22000	22000	47000	16000	16000	17000	47000	17000	17000	16000	15000	18000	18000	22000	22000	22000	25000	25000	47000	47000	29000	29000	40000	40000	65000	65000	32000	32000				
Potassium (K)	ug/g	21000	<5	5	25	25	<5	7	10	<5	<5	7	10	7	<5	<5	<5	<5	<5	<5	14	14	19	19	37	37	28	28	22	22	54	54	36	36				
Lithium (Li)	ug/g	<5	<5	5	25	25	<5	7	10	<5	<5	7	10	7	<5	<5	<5	<5	<5	<5	14	14	19	19	37	37	28	28	22	22	54	54	36	36				
Magnesium (Mg)	ug/g	4500	4500	6400	13000	13000	5900	8700	17000	5800	5800	8700	17000	8700	5800	5800	4800	5300	5300	10000	10000	10000	15000	15000	24000	24000	14000	14000	16000	16000	37000	37000	16000	16000				
Manganese (Mn)	ug/g	850	600	750	440	440	1300	340	1300	1200	1200	340	1300	340	1200	1200	760	770	770	770	770	770	1400	1400	1600	1600	1300	1300	2300	2300	1900	1900	1800	1800				
Molybdenum (Mo)	ug/g	24	0.28	0.24	0.56	0.56	0.27	0.53	0.56	0.29	0.29	0.53	0.56	0.53	0.29	0.29	0.11	4.3	4.3	0.20	0.20	0.08	0.08	0.33	0.33	1.1	1.1	0.26	0.26	0.60	0.60	0.26	0.26					
Sodium (Na)	ug/g	31000	37000	8500	11000	11000	42000	27000	24000	21000	21000	27000	24000	27000	21000	21000	22000	24000	24000	19000	19000	19000	15000	15000	6200	6200	12000	12000	6500	6500	6000	6000	7900	7900				
Nickel (Ni)	ug/g	91	10	18	20	20	13	12	40	7.2	7.2	12	40	12	7.2	7.2	9.2	23	23	28	28	38	38	76	76	22	22	41	41	67	67	25	25					
Lead (Pb)	ug/g	6.0	9.5	3.2	8.6	8.6	4.4	28	2.5	5.5	5.5	28	2.5	28	5.5	5.5	63	14	14	34	34	19	19	19	19	34	34	82	82	53	53	13	13					
Antimony (Sb)	ug/g	0.6	0.4	0.3	0.2	0.2	0.5	2.9	0.9	0.6	0.6	2.9	0.9	2.9	0.6	0.6	0.4	0.4	0.4	0.3	0.3	0.4	0.4	1.5	1.5	0.9	0.9	1.1	1.1	2.0	2.0	0.8	0.8					
Selenium (Se)	ug/g	<1	<1	<1	2	2	<1	1	1	<1	<1	1	1	1	<1	<1	<1	<1	<1	2	2	2	1	1	<1	<1	1	1	1	1	1	1	1	1	<1	<1		
Tin (Sn)	ug/g	2.4	0.5	0.4	0.9	0.9	0.4	1.1	1.3	0.7	0.7	1.1	1.3	1.1	0.7	0.7	0.9	0.9	0.9	0.7	0.7	0.5	0.5	1.3	1.3	0.9	0.9	0.7	0.7	0.8	0.8	1.3	1.3					
Titanium (Ti)	ug/g	280	240	160	250	250	390	160	2000	350	350	160	2000	160	350	350	270	380	380	210	210	190	190	160	160	160	230	230	210	210	150	150	170	170				
Thallium (Tl)	ug/g	0.7	0.8	0.3	0.3	0.3	0.5	0.6	0.2	0.8	0.8	0.6	0.2	0.6	0.8	0.8	0.5	0.5	0.5	0.5	0.5	0.3	0.3	0.4	0.4	0.5	0.5	0.5	0.5	0.3	0.3	0.4	0.4					
Uranium (U)	ug/g	0.71	0.59	0.32	0.78	0.78	0.59	0.81	0.26	0.52	0.52	0.81	0.26	0.81	0.52	0.52	0.51	0.50	0.50	0.73	0.73	0.73	0.73	0.63	0.63	0.79	0.79	0.74	0.74	0.28	0.28	0.78	0.78					
Vanadium (V)	ug/g	70	21	22	26	26	17	20	85	17	17	20	85	20	17	17	16	40	40	26	26	30	30	37	37	26	26	35	35	86	86	25	25					
Yttrium (Y)	ug/g	3.1	3.7	2.5	5.5	5.5	4.3	5.2	13	3.9	3.9	5.2	13	5.2	3.9	3.9	3.9	3.5	3.5	4.2	4.2	4.4	4.4	3.7	3.7	4.3	4.3	4.2	4.2	3.9	3.9	4.1	4.1					
Zinc (Zn)	ug/g	110	42	39	85	85	57	130	74	28	28	130	74	130	28	28	100	170	170	650	650	340	340	290	290	260	260	730	730	880	880	2500	2500					

Appendix 1
Compilation of Metals, ABA and SPLP Data

Sample ID Depth	From To	Lithology	Units	E446360	E446361	E446363	E431875	E431918	E429186	E429259	E429712	E430756	E471903	E414574	E414780	E414794	E416101	E416463	E428991	E429051	E429111
Solids Content																					
Silver (Ag)			ug/g	0.74	1.3	0.45	0.77	1.2	0.52	0.64	0.60	0.55	4.3	0.25	0.18	0.14	0.43	0.19	0.24	0.08	0.15
Aluminum (Al)			ug/g	72000	75000	74000	53000	38000	55000	76000	64000	83000	39000	70000	58000	63000	61000	57000	75000	66000	71000
Arsenic (As)			ug/g	23	30	53	33	20	34	31	61	96	39	38	15	9	27	8	46	20	5
Barium (Ba)			ug/g	540	360	320	200	20	240	630	400	630	210	120	120	83	49	21	280	180	110
Beryllium (Be)			ug/g	0.9	1.0	0.7	0.8	0.3	0.5	0.5	0.6	1.6	0.3	0.2	0.2	0.1	0.2	<0.1	0.6	0.4	0.4
Boron (B)			ug/g	5	7	5	13	11	12	20	15	6	7	12	11	6	7	3	4	4	4
Bismuth (Bi)			ug/g	0.09	0.13	<0.06	0.68	1.2	<0.06	0.43	0.30	0.13	0.52	<0.06	<0.06	0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Calcium (Ca)			ug/g	33000	22000	33000	44000	44000	62000	44000	22000	55000	43000	73000	71000	76000	58000	79000	53000	61000	51000
Cadmium (Cd)			ug/g	1.0	1.0	1.9	6.2	2.5	0.39	1.7	6.2	0.82	6.8	0.31	0.22	0.13	0.45	0.37	0.10	0.09	0.20
Cobalt (Co)			ug/g	15	14	34	40	60	32	41	35	37	40	40	40	47	44	40	37	50	32
Chromium (Cr)			ug/g	51	53	120	75	100	61	120	130	39	86	66	37	27	81	130	59	76	64
Copper (Cu)			ug/g	15	28	150	400	540	77	270	270	110	450	93	87	75	86	130	96	78	87
Iron (Fe)			ug/g	30000	29000	73000	108000	102000	61000	71000	30000	61000	66000	70000	90000	90000	91000	108000	46000	85000	53000
Potassium (K)			ug/g	14000	21000	23000	7300	650	5600	29000	21000	22000	14000	14000	3100	2800	3700	2100	16000	8500	2100
Lithium (Li)			ug/g	40	27	23	22	28	22	10	<5	32	12	28	31	42	41	47	21	28	36
Magnesium (Mg)			ug/g	21000	16000	12000	12000	14000	19000	16000	6700	14000	14000	14000	29000	31000	33000	31000	14000	31000	22000
Manganese (Mn)			ug/g	2200	2900	1600	2600	1600	2200	980	810	1900	1500	1500	1600	2100	1900	3600	1400	1300	1400
Molybdenum (Mo)			ug/g	0.28	0.21	0.53	10	9.5	0.42	2.4	1.2	1.1	1.4	3.1	<0.05	0.56	3.5	0.16	0.95	12	0.05
Sodium (Na)			ug/g	16000	12000	7300	5500	2500	11000	1200	2400	3500	1800	8300	8300	11000	6800	2300	2200	13000	22000
Nickel (Ni)			ug/g	57	46	81	69	64	56	71	90	75	78	63	84	100	64	110	63	91	56
Lead (Pb)			ug/g	16	178	6.9	6.0	14	3.9	11	10	6.5	170	3.0	2.2	2.4	5.0	3.8	2.1	1.5	2.1
Antimony (Sb)			ug/g	0.8	1.0	0.6	0.6	0.9	0.8	2.4	1.1	0.9	2.7	0.8	0.4	0.1	0.8	0.2	0.2	0.5	0.2
Selenium (Se)			ug/g	2	2	2	3	4	2	4	2	4	6	<1	<1	6	1	2	2	<1	1
Tin (Sn)			ug/g	0.8	0.7	1.6	5.3	3.5	0.4	3.2	3.3	11	7.9	0.7	0.3	0.6	0.3	0.4	0.8	0.6	0.4
Titanium (Ti)			ug/g	160	200	390	280	95	210	490	280	480	260	140	240	620	140	330	340	240	320
Thallium (Tl)			ug/g	0.2	0.5	0.5	0.2	<0.1	<0.1	0.5	0.7	1.4	0.3	0.1	<0.1	<0.1	0.2	<0.1	0.6	0.2	<0.1
Uranium (U)			ug/g	0.68	0.67	0.34	0.29	0.27	0.05	0.29	0.31	0.14	0.25	0.02	0.02	0.03	0.03	0.07	0.07	0.04	0.04
Vanadium (V)			ug/g	30	36	83	57	69	94	160	59	170	41	200	190	130	200	100	110	210	100
Yttrium (Y)			ug/g	4.4	4.2	6.0	8.5	6.8	5.9	5.6	4.8	7.5	4.4	2.6	2.7	3.7	3.1	4.1	8.8	3.8	4.8
Zinc (Zn)			ug/g	520	440	860	2600	1000	110	820	2700	530	2900	140	97	98	250	160	66	88	120

Appendix 1
Compilation of Metals, ABA and SPLP Data

Sample ID	From	E415991	E416050	E416139	E416152	E416544	E429326	E429787	E447184	E447259	E447267	E447461	E447481	E446338	E446340	E446341	E446339	E446342	E446343
Depth	To	16.80	69.00	196.00	261.00	128.70	324.00	100.00	10.00	56.00	130.50	14.70	62.30	61000	57000	56000	65000	58000	58000
Lithology	VM1	VM1	VM1	VM1	VM1	VM1	VM1	VM1	VM1	VM1	VM1	VM1	VM1	VM1	VM1	VM1	(99Flow)	(99Flow)	(99Flow)
Units	ug/g	ug/g	ug/g	ug/g	ug/g	ug/g	ug/g	ug/g	ug/g	ug/g	ug/g	ug/g	ug/g	ug/g	ug/g	ug/g	ug/g	ug/g	ug/g
Silver (Ag)	0.20	0.29	0.22	1.1	0.08	0.13	0.16	0.13	0.10	0.11	0.11	0.14	0.12	0.16	0.29	0.20	0.14	0.14	0.18
Aluminum (Al)	57000	75000	63000	41000	60000	71000	64000	71000	69000	75000	75000	67000	59000	61000	57000	56000	65000	58000	58000
Arsenic (As)	5	32	47	14	28	41	3	41	4	11	11	11	36	<2	7	<2	8	<2	3
Barium (Ba)	36	230	56	18	110	69	370	69	180	77	77	120	38	22	71	130	130	140	31
Beryllium (Be)	0.1	0.2	<0.1	0.3	0.3	0.5	0.4	0.2	0.2	0.1	0.1	0.2	0.2	<0.1	0.6	0.6	<0.1	0.2	0.3
Boron (B)	9	7	3	9	15	4	17	4	5	<3	<3	18	11	8	3	3	5	4	5
Bismuth (Bi)	0.08	0.39	<0.06	0.87	0.09	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Calcium (Ca)	84000	50000	64000	40000	60000	65000	48000	65000	82000	57000	57000	63000	81000	67000	39000	40000	64000	35000	60000
Cadmium (Cd)	0.09	0.17	0.08	2.6	0.07	0.11	0.06	0.11	0.10	0.07	0.07	0.07	0.04	0.18	0.29	0.18	0.09	0.11	0.18
Cobalt (Co)	53	39	42	51	43	40	36	40	41	37	37	48	45	38	21	19	37	34	30
Chromium (Cr)	56	84	170	40	95	240	52	240	170	130	130	47	130	40	16	<0.2	86	49	66
Copper (Cu)	97	98	83	550	73	80	48	80	86	83	83	120	50	130	29	30	66	50	83
Iron (Fe)	86000	46000	52000	64000	64000	42000	98000	42000	60000	41000	41000	63000	65000	53000	103000	105000	50000	87000	75000
Potassium (K)	2100	18000	19000	750	12000	9600	13000	13000	6200	4700	4700	5900	4300	500	1400	4300	9300	5400	510
Lithium (Li)	38	19	13	30	32	21	29	21	34	26	26	36	27	16	8	24	30	12	12
Magnesium (Mg)	32000	26000	37000	13000	32000	29000	32000	32000	37000	29000	29000	31000	35000	28000	14000	12000	31000	26000	26000
Manganese (Mn)	1400	1900	1200	1600	1300	1400	1100	1400	1400	1300	1300	1300	1300	1600	2000	1700	1200	1200	1700
Molybdenum (Mo)	5.8	<0.05	0.06	2.5	1.9	0.10	<0.05	<0.05	0.84	<0.05	<0.05	<0.05	<0.05	0.38	0.55	0.18	<0.05	0.32	0.11
Sodium (Na)	6900	3100	3200	2800	4000	6200	6500	6200	7900	7900	7900	14000	9800	19000	18000	6700	12000	16000	18000
Nickel (Ni)	78	65	95	44	49	100	43	100	80	76	76	73	59	69	13	15	62	42	51
Lead (Pb)	1.8	3.5	<0.1	0.8	0.4	<0.1	0.5	<0.1	0.3	<0.1	<0.1	0.4	0.3	0.6	0.2	0.1	0.2	0.2	0.6
Antimony (Sb)	0.5	0.2	<0.1	5	2	3	<1	<1	<1	3	<1	<1	<1	2	<1	<1	<1	<1	<1
Selenium (Se)	<1	5	5	7	2	3	<1	3	<1	3	<1	<1	<1	2	<1	<1	<1	1	1
Tin (Sn)	0.6	0.3	0.4	3.1	0.4	0.3	0.4	0.3	0.5	0.5	0.5	0.3	0.3	0.5	1.6	0.4	0.3	0.8	1.0
Titanium (Ti)	160	260	380	94	160	190	280	190	2700	350	350	280	150	1300	7100	1100	230	350	4600
Thallium (Tl)	<0.1	0.3	0.1	<0.1	0.2	<0.1	0.7	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1
Uranium (U)	0.02	0.03	0.02	0.30	0.02	0.02	0.05	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.12	0.10	0.02	0.06	0.08
Vanadium (V)	210	120	100	32	190	96	180	96	200	100	100	230	160	130	18	9.3	110	100	110
Yttrium (Y)	4.2	2.3	3.1	7.1	3.7	2.7	4.9	2.7	11	8.7	8.7	4.1	2.7	8.0	27	12	5.1	6.6	31
Zinc (Zn)	74	160	68	1000	110	83	83	83	77	80	80	73	37	100	160	130	88	85	89

Appendix 1
Compilation of Metals, ABA and SPLP Data

Sample ID Depth	Lithology	From To		Volc (99Flow)	Volc (99Flow)	Volc (99Flow)	Volc (99Flow)	Volc (99Flow)	Volc (99Flow)	Volc (Cntl)	Volc (Cntl)	Volc/Sed	Volc/Sed
		E446344	E446348										
	Solids Content												
	Silver (Ag)	0.20	0.18	0.17	0.28	0.16	0.18	0.26	0.15	0.34	0.20	0.19	
	Aluminum (Al)	64000	59000	63000	63000	66000	59000	70000	64000	67000	70000	62000	
	Arsenic (As)	10	23	<2	7	4	4	15	27	18	5	3	
	Barium (Ba)	180	200	16	240	45	250	210	110	170	170	180	
	Beryllium (Be)	0.4	0.2	0.3	0.4	<0.1	0.3	0.6	0.3	0.3	0.5	0.4	
	Boron (B)	4	<3	4	5	<3	<3	8	6	7	<3	<3	
	Bismuth (Bi)	<0.06	<0.06	<0.06	<0.06	0.24	<0.06	<0.06	0.09	<0.06	<0.06	<0.06	
	Calcium (Ca)	52000	42000	35000	41000	55000	49000	40000	69000	62000	36000	41000	
	Cadmium (Cd)	0.13	0.13	0.18	0.16	0.09	0.14	0.14	0.22	0.26	0.10	0.13	
	Cobalt (Co)	36	36	37	37	41	32	52	40	37	43	42	
	Chromium (Cr)	24	47	51	50	62	39	70	65	86	28	20	
	Copper (Cu)	86	44	69	86	110	42	59	96	77	98	80	
	Iron (Fe)	74000	92000	94000	75000	83000	85000	87000	78000	72000	77000	82000	
	Potassium (K)	8000	7700	220	8000	2700	10000	12000	6800	7200	5900	5900	
	Lithium (Li)	12	19	14	19	33	13	36	29	29	25	25	
	Magnesium (Mg)	20000	29000	29000	16000	32000	19000	16000	26000	31000	18000	20000	
	Manganese (Mn)	1400	1500	1300	1100	1400	1500	1300	1500	1300	1100	1300	
	Molybdenum (Mo)	0.32	0.24	0.22	0.29	0.08	<0.05	0.46	1.3	2.2	0.41	0.14	
	Sodium (Na)	18000	13000	23000	19000	15000	17000	19000	10000	11000	15000	11000	
	Nickel (Ni)	45	46	45	45	60	38	49	66	66	71	64	
	Lead (Pb)	0.8	1.5	0.6	1.9	1.8	0.8	3.0	1.3	10	0.7	0.8	
	Antimony (Sb)	0.1	1.3	0.6	0.3	0.2	<0.1	0.7	0.4	0.3	0.4	0.2	
	Selenium (Se)	2	2	<1	2	2	2	1	<1	1	2	1	
	Tin (Sn)	0.4	0.3	0.6	0.4	0.2	0.3	0.7	0.8	0.5	0.5	0.3	
	Titanium (Ti)	260	250	5600	290	130	390	610	230	420	420	340	
	Thallium (Tl)	<0.1	0.1	<0.1	0.1	<0.1	<0.1	0.2	<0.1	<0.1	0.3	0.2	
	Uranium (U)	0.06	0.05	0.09	0.06	0.01	0.06	0.15	0.03	0.15	0.06	0.06	
	Vanadium (V)	95	100	120	100	120	99	100	210	180	140	140	
	Yttrium (Y)	5.9	6.2	25	6.6	3.1	7.0	7.2	3.4	3.5	6.4	6.5	
	Zinc (Zn)	75	86	120	93	110	88	82	130	130	110	100	

Appendix 1
Compilation of Metals, ABA and SPLP Data

Sample ID Depth	From To	Lithology	SPLP Chemistry																		
			E446360	E446361	E446363	E431875	E431918	E429186	E429259	E429712	E430756	E471903	E414574	E414780	E414794	E416101	E416463	E428991	E429051	E429111	
			Porph (PLP)	Porph (PLP)	Sed	SS10	SS10	SS8	SS8	SS8	SS8	SS8	SS8	SS8	VM	VM	VM	VM	VM	VM	VM
Aluminum (Al)	mg/L		0.356	1.15	0.346	0.23	0.07	0.24	0.33	0.34	0.34	0.44	0.34	0.52	0.18	0.24	0.59	0.36	0.94		
Arsenic (As)	mg/L		0.0344	0.0593	0.0233	<0.0005	<0.0005	0.0015	0.0014	0.0228	0.0486	0.0016	<0.0005	0.0007	0.0008	0.0006	0.0102	0.0011	<0.0005		
Silver (Ag)	mg/L		<0.0001	<0.0001	<0.0001	<0.0003	0.0004	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003		
Barium (Ba)	mg/L		0.886	0.948	0.838	0.217	0.312	0.588	0.562	0.647	0.586	0.668	0.617	0.679	0.531	0.562	0.674	0.743	0.178		
Beryllium (Be)	mg/L		<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004		
Boron (B)	mg/L		0.440	0.521	0.328	0.013	0.234	0.323	0.271	0.321	0.382	0.314	0.248	0.371	0.283	0.301	0.256	0.337	0.005		
Bismuth (Bi)	mg/L		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002		
Calcium (Ca)	mg/L		5.90	6.17	11.8	14.8	16.3	9.85	10.3	10.3	8.56	7.16	8.62	7.81	8.14	8.08	8.00	7.81	8.38		
Cadmium (Cd)	mg/L		<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006		
Cobalt (Co)	mg/L		0.00036	0.00036	0.00155	0.00011	<0.0001	<0.0001	0.00070	0.000231	0.00064	0.000045	<0.0001	<0.0001	<0.0001	0.00027	0.00062	0.00023	<0.0001		
Chromium (Cr)	mg/L		0.0008	0.0019	0.0009	<0.0003	0.0004	0.0006	0.0007	0.0013	0.0007	0.0007	0.0005	0.0007	0.0006	0.0007	0.0006	0.0009	<0.0003		
Copper (Cu)	mg/L		0.0006	0.0010	0.0017	0.0002	0.0005	0.0007	0.0007	0.0024	0.0006	0.0007	0.0003	0.0002	<0.0001	0.0004	0.0006	0.0003	0.0002		
Iron (Fe)	mg/L		0.02	0.16	0.18	<0.01	<0.01	<0.01	0.03	0.08	0.09	0.03	<0.01	<0.01	<0.01	0.01	0.06	<0.01	<0.01		
Potassium (K)	mg/L		0.62	1.55	2.33	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002		
Lithium (Li)	mg/L		0.0010	0.0012	<0.0007	2.77	1.66	2.93	2.22	1.76	0.555	1.85	2.73	0.952	2.19	1.39	0.646	2.26	0.954		
Magnesium (Mg)	mg/L		2.42	1.76	2.42	0.00219	0.00497	0.00010	0.00129	0.00034	0.00061	0.00009	0.00011	0.00010	0.00005	0.00014	0.00013	0.00006	0.00007		
Manganese (Mn)	mg/L		0.00260	0.0271	0.00911	1.83	6.16	7.66	8.45	8.97	9.24	9.47	6.45	7.85	8.63	7.95	6.92	8.04	1.35		
Molybdenum (Mo)	mg/L		0.00019	0.00023	0.00030	0.00007	0.00016	<0.0007	0.0018	0.0013	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007		
Sodium (Na)	mg/L		8.92	10.3	7.64	<0.0007	0.0015	<0.0007	0.0025	0.0009	<0.0002	<0.0009	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002		
Nickel (Ni)	mg/L		<0.0007	0.0025	0.0008	0.00015	0.00025	<0.0002	0.00026	0.00009	<0.0002	<0.0002	<0.0002	<0.0002	0.00020	<0.0002	<0.0002	<0.0002	<0.0002		
Lead (Pb)	mg/L		0.00045	0.00566	0.00035	0.0020	0.0009	0.0024	0.0031	0.0028	0.0020	0.0052	0.0004	0.0007	0.0013	0.0005	0.0009	0.0018	0.0017		
Antimony (Sb)	mg/L		0.0036	0.0042	0.0025	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003		
Selenium (Se)	mg/L		<0.001	<0.001	<0.001	<0.003	<0.003	0.0005	<0.0003	0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	0.0005	<0.0003	<0.0003	<0.0003		
Tin (Sn)	mg/L		<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	0.00317	0.0003	0.0159	0.0221	0.0127	0.0244	0.0293	<0.0003	0.0134	0.0190	0.0199	<0.0003		
Strontium (Sr)	mg/L		0.0503	0.0511	0.0345	0.0340	0.0440	<0.0002	0.0227	0.0036	0.0016	0.0005	<0.0002	0.0002	0.0200	0.0005	0.0016	0.0006	0.0467		
Titanium (Ti)	mg/L		0.0010	0.0029	0.0015	<0.0002	0.0012	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002		
Thallium (Tl)	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		
Uranium (U)	mg/L		<0.0002	0.00013	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002		
Vanadium (V)	mg/L		0.00140	0.00245	0.00086	0.00013	0.00029	0.00085	0.00087	0.00087	0.00453	0.00217	0.0052	0.00120	0.00067	0.00038	0.00280	0.00132	0.00197		
Tungsten (W)	mg/L		0.00016	0.00068	0.00161	0.00074	<0.0007	0.00013	<0.0007	0.00015	0.00032	0.00015	0.00007	0.00010	<0.0007	0.00020	0.00009	0.00009	<0.0007		
Yttrium (Y)	mg/L		0.00062	0.00088	0.000051	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004		
Zinc (Zn)	mg/L		0.273	0.269	0.181	0.0061	0.0539	0.102	0.0723	0.109	0.0937	0.105	0.0636	0.148	0.0907	0.0913	0.0807	0.124	0.0027		

Appendix 1
Compilation of Metals, ABA and SPLP Data

Sample ID	From	To	Lithology	E429867	E429962	E430694	E430723	E430787	E430991	E431039	E431807	E446417	E446913	E446973	E447310	E447328	E447504	E447522	E471636	E471732	E414703	
Depth	167.00	240.00	30.00	86.00	199.00	200.00	14.00	100.00	50.00	219.60	220.60	62.00	122.00	170.00	260.00	131.00	196.00	69.00	150.00	150.00	210.50	
Depth	168.00	241.00	31.00	87.00	200.00	200.00	15.00	101.00	51.50	220.60	63.00	123.00	171.00	261.00	132.50	197.50	70.00	151.00	151.00	211.50	211.50	
Lithology	VM	VM	VM	VM	VM	VM	VM	VM	VM	VM	VM	VM	VM	VM	VM	VM	VM	VM	VM	VM	VM	VM1
SPLP Chemistry	Units	Units	Units	Units	Units	Units	Units	Units	Units	Units	Units	Units	Units	Units	Units	Units	Units	Units	Units	Units	Units	Units
Aluminum (Al)	mg/L	0.25	0.56	0.18	0.16	0.49	0.84	1.06	0.63	0.49	0.74	0.51	0.57	0.52	0.55	0.46	0.30	0.37	0.37	0.53	0.53	
Arsenic (As)	mg/L	0.0095	0.0005	0.0019	0.0071	0.0008	0.0014	<0.0003	0.0013	<0.0005	0.0020	<0.0003	<0.0003	0.0028	<0.0005	<0.0005	0.0008	0.0053	<0.0003	0.0005	0.0005	
Silver (Ag)	mg/L	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	
Barium (Ba)	mg/L	0.538	0.283	0.555	0.606	0.590	0.182	0.204	0.224	0.701	0.232	0.585	0.645	0.734	0.588	0.574	0.665	0.651	0.651	0.682	0.682	
Beryllium (Be)	mg/L	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	
Boron (B)	mg/L	0.261	0.012	0.307	0.290	0.254	0.007	0.007	0.012	0.308	0.012	0.297	0.358	0.348	0.281	0.268	0.342	0.316	0.316	0.398	0.398	
Bismuth (Bi)	mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
Calcium (Ca)	mg/L	11.6	9.12	11.7	17.1	7.01	8.36	9.09	9.72	7.49	8.22	7.69	7.01	6.42	6.82	7.22	8.16	8.11	8.11	6.75	6.75	
Cadmium (Cd)	mg/L	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	
Cobalt (Co)	mg/L	0.00024	<0.0001	0.00009	0.00047	0.00042	<0.0001	<0.0001	<0.0001	0.00069	<0.0001	0.00024	<0.0001	0.00047	0.00022	0.00011	0.00012	0.00012	0.00012	0.00008	0.00008	
Chromium (Cr)	mg/L	0.0004	<0.0003	0.0006	0.0005	0.0004	<0.0003	<0.0003	0.0015	<0.0003	<0.0003	0.0015	<0.0003	0.0006	0.0010	0.0005	0.0006	0.0005	0.0005	0.0013	0.0013	
Copper (Cu)	mg/L	0.0005	0.0003	0.0002	0.0002	0.0005	<0.0001	0.0005	0.0002	0.0009	<0.0001	0.0004	0.0003	0.0004	0.0003	0.0003	0.0003	0.0003	0.0004	0.0003	0.0003	
Iron (Fe)	mg/L	<0.01	<0.01	0.02	<0.01	0.05	<0.01	<0.01	<0.01	0.15	<0.01	0.01	0.02	0.05	0.02	0.01	<0.01	<0.01	<0.01	0.01	0.02	
Potassium (K)	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	
Lithium (Li)	mg/L	2.94	2.85	1.84	3.12	0.514	0.559	0.431	1.32	1.13	2.76	0.883	0.673	0.567	0.625	0.722	2.39	1.52	1.52	0.797	0.797	
Magnesium (Mg)	mg/L	0.00016	0.00006	0.00054	0.00091	0.00014	0.00015	0.00016	0.00019	0.00008	<0.0001	0.00007	0.00012	0.00009	0.00005	0.00005	0.00010	0.00006	0.00006	0.00006	0.00013	
Manganese (Mn)	mg/L	8.45	1.97	8.40	7.53	6.08	1.83	1.95	3.28	8.74	1.99	6.31	8.98	8.01	6.75	6.16	8.90	9.14	9.14	8.57	8.57	
Molybdenum (Mo)	mg/L	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	
Sodium (Na)	mg/L	0.0004	0.00014	0.00022	<0.0002	<0.0002	0.00015	0.00018	0.00012	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
Nickel (Ni)	mg/L	0.0020	0.0011	<0.0002	0.0010	<0.0002	0.0003	0.0004	0.0010	0.0006	0.0007	0.0008	0.0003	0.0003	0.0003	0.0017	0.0022	0.0014	0.0014	0.0008	0.0008	
Lead (Pb)	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	
Antimony (Sb)	mg/L	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	
Selenium (Se)	mg/L	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	
Tin (Sn)	mg/L	0.0178	0.0171	0.0283	0.0245	0.0188	0.0273	0.0396	0.0196	0.0183	0.0124	0.0229	0.0205	0.0221	0.0187	0.0301	0.0207	0.0180	0.0180	0.0220	0.0220	
Strontium (Sr)	mg/L	0.0003	<0.0002	0.0008	0.0004	0.0051	<0.0002	0.0002	<0.0002	0.0048	<0.0002	0.0004	0.0008	0.0028	0.0013	0.0005	0.0004	0.0004	0.0004	0.0008	0.0008	
Titanium (Ti)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Thallium (Tl)	mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
Uranium (U)	mg/L	0.00086	0.00118	0.00010	<0.0006	0.00353	0.00056	0.00041	0.00012	0.00243	0.00121	0.00128	0.00200	0.00453	0.00347	0.00214	0.00073	0.00066	0.00066	0.00280	0.00280	
Vanadium (V)	mg/L	0.00019	0.00055	0.00820	0.00027	0.00030	0.00066	<0.0007	0.00027	0.00016	<0.0007	0.00008	<0.0007	0.00028	0.00008	0.00014	0.00010	0.00010	0.00010	0.00024	0.00024	
Tungsten (W)	mg/L	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	
Yttrium (Y)	mg/L	0.0705	0.0032	0.110	0.0736	0.0733	0.0028	0.0034	0.0033	0.105	0.0047	0.0956	0.120	0.125	0.0982	0.0949	0.0913	0.0854	0.0854	0.144	0.144	
Zinc (Zn)	mg/L	0.0705	0.0032	0.110	0.0736	0.0733	0.0028	0.0034	0.0033	0.105	0.0047	0.0956	0.120	0.125	0.0982	0.0949	0.0913	0.0854	0.0854	0.144	0.144	

Appendix 1
Compilation of Metals, ABA and SPLP Data

Sample ID Depth	From To		E415991	E416050	E416139	E416152	E416544	E429326	E429787	E447184	E447259	E447267	E447461	E447481	E446338	E446340	E446341	E446339	E446342	E446343	
	VM1	VM1																			
Lithology	VM1	VM1	VM1	VM1	VM1	VM1	VM1	VM1	VM1	VM1	VM1	VM1	VM1	VM1	VM1	VM1	VM1	VM1	VM1	VM1	
SPLP Chemistry	Units																				
Aluminum (Al)	mg/L	0.31	0.16	0.30	0.25	0.27	0.31	0.59	0.25	0.49	0.50	0.85	0.28	0.497	0.600	0.264	0.504	0.325	0.319		
Arsenic (As)	mg/L	<0.0005	0.0076	0.0173	0.0078	0.0021	<0.0005	<0.0005	0.0016	<0.0005	0.0006	<0.0005	0.0088	<0.0002	0.0004	0.0005	0.0007	<0.0002	<0.0002		
Silver (Ag)	mg/L	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		
Barium (Ba)	mg/L	0.541	0.579	0.605	0.546	0.711	0.686	0.200	0.621	0.728	0.634	0.170	0.545	0.649	0.654	0.602	0.669	0.665	0.641		
Beryllium (Be)	mg/L	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	0.0009	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004		
Boron (B)	mg/L	0.305	0.260	0.272	0.239	0.369	0.283	0.007	0.287	0.357	0.300	0.005	0.233	0.269	0.262	0.285	0.264	0.293	0.277		
Bismuth (Bi)	mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.0005	0.0002	<0.0002		
Calcium (Ca)	mg/L	8.57	7.99	8.17	7.59	7.41	10.2	10.5	6.84	6.80	6.82	7.55	7.69	7.47	8.91	8.92	7.61	8.41	7.39		
Cadmium (Cd)	mg/L	0.00010	<0.00006	<0.00006	<0.00006	<0.00006	<0.00006	<0.00006	<0.00006	<0.00006	<0.00006	<0.00006	<0.00006	<0.00006	<0.00006	<0.00006	<0.00006	<0.00006	<0.00006		
Cobalt (Co)	mg/L	0.00071	0.00013	<0.0001	<0.0001	0.00018	0.00017	<0.0001	0.00014	0.00023	0.00016	<0.0001	0.00018	0.00037	0.00075	0.00059	0.00058	0.00038	0.00025		
Chromium (Cr)	mg/L	0.0006	0.0005	0.0005	0.0005	0.0009	0.0006	<0.0003	0.0007	0.0008	0.0007	<0.0003	0.0006	0.0005	0.0005	0.0005	0.0007	0.0005	0.0005		
Copper (Cu)	mg/L	0.0002	0.0001	0.0008	0.0002	0.0004	0.0003	<0.0001	0.0007	0.0004	0.0003	0.0003	0.0002	0.0011	0.0008	0.0008	0.0011	0.0010	0.0004		
Iron (Fe)	mg/L	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	0.02	0.02	<0.01	<0.01	0.02	0.05	0.16	0.02	0.04	0.04		
Potassium (K)	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.29	0.26	0.54	0.37	0.24		
Lithium (Li)	mg/L	2.06	2.27	2.93	2.70	2.33	2.71	2.98	1.85	0.569	0.645	0.815	3.94	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007		
Magnesium (Mg)	mg/L	0.00014	0.00007	0.00008	0.00006	0.00010	0.00019	<0.0001	0.00009	0.00010	0.00007	<0.0001	0.00014	0.722	0.486	0.419	0.575	1.78	0.506		
Manganese (Mn)	mg/L	9.18	7.88	7.29	8.34	9.67	7.97	1.37	7.03	7.90	7.47	1.37	8.33	0.00072	0.00111	0.00439	0.00070	0.00090	0.00077		
Molybdenum (Mo)	mg/L	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	6.58	5.76	5.89	6.21	6.38	5.34		
Sodium (Na)	mg/L	0.00035	0.00025	0.00034	0.00025	<0.0002	<0.0002	0.00032	<0.0002	<0.0002	<0.0002	0.00017	0.00029	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007		
Nickel (Ni)	mg/L	0.0008	0.0010	0.0008	0.0006	0.0005	0.0009	0.0009	0.0002	0.0004	<0.0002	0.0008	0.0004	0.00108	0.00035	0.00026	0.00069	0.00033	0.00023		
Lead (Pb)	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.0004	0.0005	0.0002	0.0004	0.0006	0.0004		
Antimony (Sb)	mg/L	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003		
Selenium (Se)	mg/L	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	0.0005	<0.0003	0.0003	0.0005	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003		
Tin (Sn)	mg/L	0.0220	0.0136	0.0134	0.0213	0.0066	0.0232	0.0255	0.0120	0.0172	0.0149	0.0177	0.0121	0.0300	0.0459	0.0278	0.0259	0.0436	0.0380		
Strontium (Sr)	mg/L	0.0006	0.0009	0.0004	0.0002	0.0006	<0.0002	<0.0002	<0.0002	0.0009	0.0006	<0.0002	0.0002	0.0002	0.0008	0.0022	0.0004	0.0006	0.0028		
Titanium (Ti)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		
Uranium (U)	mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002		
Vanadium (V)	mg/L	0.00073	0.00118	0.00167	0.00136	0.00133	0.00046	0.00076	0.00099	0.00235	0.00249	0.00246	0.00102	0.00344	0.00023	0.00012	0.00032	0.00067	0.00143		
Tungsten (W)	mg/L	<0.0007	<0.0007	<0.0007	<0.0007	0.00030	0.00008	0.00007	0.00012	0.00025	0.00008	0.00009	0.00017	0.00017	<0.0007	<0.0007	0.00014	<0.0007	<0.0007		
Yttrium (Y)	mg/L	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	0.00017	0.00045	0.00030	0.00016	0.00022	0.00033		
Zinc (Zn)	mg/L	0.0728	0.0861	0.122	0.0525	0.102	0.0795	0.0035	0.0806	0.135	0.102	0.0027	0.0604	0.0845	0.0839	0.0885	0.0781	0.0859	0.0959		

Appendix 1
Compilation of Metals, ABA and SPLP Data

Sample ID Depth	Lithology	From To		Volc (99Flow)	Volc (99Flow)	Volc (99Flow)	Volc (99Flow)	Volc (99Flow)	Volc (Cntl)	Volc (Cntl)	Volc/Sed	Volc/Sed
		E446344	E446348									
	SPLP Chemistry											
	Aluminum (Al)	mg/L	0.369	0.297	0.495	0.368	0.382	0.317	0.845		0.546	0.477
	Arsenic (As)	mg/L	0.0002	0.0006	<0.0002	0.0006	0.0005	<0.0002	0.0022		0.0029	0.0014
	Silver (Ag)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		<0.0001	<0.0001
	Barium (Ba)	mg/L	0.667	0.707	0.667	0.781	0.733	0.767	0.908		0.646	0.653
	Beryllium (Be)	mg/L	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004		<0.0004	<0.0004
	Boron (B)	mg/L	0.295	0.279	0.292	0.289	0.316	0.291	0.402		0.301	0.289
	Bismuth (Bi)	mg/L	<0.0002	<0.0002	<0.0002	0.0003	<0.0002	<0.0002	<0.0002		<0.0002	<0.0002
	Calcium (Ca)	mg/L	8.04	10.1	7.44	9.03	7.85	10.2	12.0		8.18	8.65
	Cadmium (Cd)	mg/L	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006		<0.0006	<0.0006
	Cobalt (Co)	mg/L	0.00037	0.00028	0.00044	0.00055	0.00031	0.00017	0.000586		0.00087	0.00049
	Chromium (Cr)	mg/L	0.0006	0.0006	0.0005	0.0007	0.0007	0.0005	0.0016		0.0006	0.0005
	Copper (Cu)	mg/L	0.0005	0.0009	0.0009	0.0006	0.0005	0.0006	0.0016		0.0008	0.0005
	Iron (Fe)	mg/L	0.03	<0.01	0.07	0.06	0.03	0.01	1.40		0.11	0.07
	Potassium (K)	mg/L	0.50	0.46	0.27	0.46	0.34	0.51	1.07		0.46	0.49
	Lithium (Li)	mg/L	<0.0007	<0.0007	<0.0007	0.0013	0.0016	0.0009	0.0007		<0.0007	<0.0007
	Magnesium (Mg)	mg/L	1.31	2.67	0.720	2.19	1.46	2.13	2.91		0.740	0.952
	Manganese (Mn)	mg/L	0.00156	0.00084	0.00089	0.00278	0.00095	0.00214	0.0248		0.00152	0.00155
	Molybdenum (Mo)	mg/L	0.00052	0.00035	0.00018	0.00024	0.00038	0.00041	0.00012		0.00043	0.00029
	Sodium (Na)	mg/L	6.76	6.37	6.06	6.86	6.63	6.64	7.83		7.07	6.84
	Nickel (Ni)	mg/L	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	0.0010		<0.0007	<0.0007
	Lead (Pb)	mg/L	0.00033	0.00030	0.00018	0.00018	0.00017	0.00018	0.00032		0.00031	0.00022
	Antimony (Sb)	mg/L	0.0008	0.0019	0.0005	0.0015	0.0044	0.0004	0.0013		0.0019	0.0013
	Selenium (Se)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001	<0.001
	Tin (Sn)	mg/L	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003		<0.0003	<0.0003
	Strontium (Sr)	mg/L	0.0362	0.0337	0.0566	0.0457	0.0339	0.0390	0.0474		0.0317	0.0324
	Titanium (Ti)	mg/L	0.0006	0.0008	0.0072	0.0011	0.0008	0.0005	0.0061		0.0010	0.0009
	Thallium (Tl)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		<0.0001	<0.0001
	Uranium (U)	mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002		<0.0002	<0.0002
	Vanadium (V)	mg/L	0.00095	0.00059	0.00189	0.00130	0.00123	0.00053	0.00253		0.00271	0.00161
	Tungsten (W)	mg/L	<0.00007	0.00012	0.00044	0.00027	0.00023	0.00015	0.00015		0.00014	0.00015
	Yttrium (Y)	mg/L	0.000018	0.000016	0.00040	0.00025	0.00021	0.00018	0.000123		0.00031	0.00034
	Zinc (Zn)	mg/L	0.0808	0.0904	0.100	0.0969	0.121	0.0919	0.252		0.0996	0.0875

Appendix 1
Compilation of Metals, ABA and SPLP Data

Sample ID	From	To	E429867	E429862	E430694	E430723	E430787	E430991	E431039	E431807	E446417	E446913	E446973	E447310	E447328	E447504	E447522	E471636	E471732	E414703	
Depth			167.00	240.00	30.00	86.00	199.00	14.00	100.00	50.00	219.60	62.00	122.00	170.00	260.00	131.00	196.00	69.00	150.00	210.50	
Lithology			168.00	241.00	31.00	87.00	200.00	15.00	101.00	51.50	220.60	63.00	123.00	171.00	261.00	132.50	197.50	70.00	151.00	211.50	
	VM	VM	VM	VM	VM	VM	VM	VM	VM	VM	VM	VM	VM	VM	VM	VM	VM	VM	VM	VM1	
Acid Base Accounting																					
Units																					
Paste pH	9.50	9.67	9.27	9.28	9.12	9.11	9.17	9.26	9.67	9.37	9.17	9.23	9.43	9.23	9.34	9.43	9.23	9.08	9.75	9.75	
Sobeck NP	159	84.6	193	185	102	153	160	170	81.7	104	127	186	173	183	88.4	173	183	180	91.6	91.6	
Carbonate NP	173.3	105.8	200.0	191.7	99.2	180.0	165.0	188.3	96.7	107.5	134.2	223.3	222.5	210.8	85.8	222.5	200.8	210.8	110.0	110.0	
AP	0.94	0.31	1.25	1.88	2.50	1.88	0.62	1.88	1.88	8.12	4.06	11.2	4.06	0.31	1.56	4.06	4.38	0.31	39.7	39.7	
Net NP	158	84.3	192	183	99.1	151	160	168	79.9	96.0	123	175	169	180	86.9	169	179	180	51.9	51.9	
Sobeck NP/AP	169	273	155	98.5	40.6	81.5	259	90.4	43.5	12.8	31.3	16.6	42.6	41.8	56.7	42.6	41.8	582	2.3	2.3	
Carbonate NP/AP	184.4	341.4	160.0	102.0	39.7	95.8	266.1	100.2	51.4	13.2	33.0	19.9	54.8	680.2	55.0	54.8	45.9	680.2	2.8	2.8	
S2-	0.078	0.033	0.088	0.090	0.084	0.068	0.039	0.084	0.037	0.284	0.146	0.397	0.170	0.025	0.083	0.170	0.170	0.025	1.21	1.21	
Sulphide	0.03	0.01	0.04	0.06	0.08	0.06	0.02	0.06	0.06	0.26	0.13	0.36	0.13	<0.4	0.05	0.13	0.14	<0.4	1.27	1.27	
SO4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	
C(t)	2.08	1.27	2.40	2.30	1.19	2.16	1.98	2.26	1.16	1.29	1.61	2.68	2.67	2.41	1.03	2.67	2.41	2.53	1.32	1.32	
Carbonate	9.96	5.65	11.6	11.4	5.67	10.1	9.58	10.7	5.13	6.10	7.68	12.4	11.8	11.7	5.01	11.8	11.7	12.0	5.04	5.04	

Appendix 1
Compilation of Metals, ABA and SPLP Data

Sample ID Depth	From To		E415991	E416050	E416139	E416152	E416544	E429326	E429787	E447184	E447259	E447267	E447461	E447481	E446338	E446340	E446341	E446339	E446342	E446343	
	VM1	VM1																			VM1
Lithology			Units																		
Paste pH			units	9.68	9.68	9.73	9.68	9.59	9.61	9.86	9.72	9.38	9.35	8.59	9.28	9.12	8.80	9.40	8.81	8.92	8.79
Sobeck NP			tCaCO3/l	116	116	111	83.3	143	102	152	103	148	124	130	83.4	194	192	273	218	57.6	209
Carbonate NP			tCaCO3/l	164.2	160.0	146.7	139.2	230.0	116.7	210.8	158.3	219.2	197.5	156.7	104.2	221.7	185.8	301.7	215.0	179.2	212.5
AP			tCaCO3/l	22.2	56.2	15.0	65.3	35.0	60.3	28.7	47.8	10.9	14.7	0.31	7.5	5.3	12.3	2.8	0.8	0.31	2.1
Net NP			tCaCO3/l	94.3	37.3	96.2	17.9	108	41.3	124	54.8	138	110	130	75.9	188	180	270	217	57.3	207
Sobeck NP/AP			ratio	5.2	1.7	7.4	1.3	4.1	1.7	5.3	2.1	13.6	8.5	421	11.1	36.4	15.6	97.4	279	186	98.5
Carbonate NP/AP			ratio	7.4	2.8	9.8	2.1	6.6	1.9	7.3	3.3	20.1	13.4	505.4	13.9	41.8	15.1	107.7	268.8	578.0	101.2
S2-			%	0.737	1.77	0.487	2.27	1.11	2.04	0.929	1.53	0.412	0.508	0.014	0.35	0.21	0.58	0.12	0.035	0.040	0.081
Sulphide			%	0.71	1.80	0.48	2.09	1.12	1.93	0.92	1.53	0.35	0.47	<0.01	0.24	0.17	0.40	0.09	0.02	<0.01	0.07
SO4			%	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
C(t)			%	1.97	1.92	1.76	1.67	2.76	1.40	2.53	1.90	2.63	2.37	1.88	1.25	2.66	2.23	3.62	2.58	2.15	2.55
Carbonate			%	7.23	5.28	6.95	4.33	8.46	5.70	9.65	6.24	10.3	7.61	8.75	5.19	12.9	10.8	17.7	12.6	10.5	12.2

Appendix 1
 Compilation of Metals, ABA and SPLP Data

Sample ID Depth	Lithology	From To		Volc (99Flow)	Volc (99Flow)	Volc (99Flow)	Volc (99Flow)	Volc (99Flow)	Volc (99Flow)	Volc (Cntl)	Volc (Cntl)	Volc/Sed	Volc/Sed
		E446344	E446348										
Acid Base Accounting													
	Units	Volc (99Flow)	Volc (99Flow)	Volc (99Flow)	Volc (99Flow)	Volc (99Flow)	Volc (99Flow)	Volc (99Flow)	Volc (99Flow)	Volc (Cntl)	Volc (Cntl)	Volc/Sed	Volc/Sed
Paste pH	units	8.89	9.15	9.37	8.50	8.75	9.12	8.66	8.44				
Sobeck NP	tCaCO3/1i	141	178	331	166	201	198	183	170				
Carbonate NP	tCaCO3/1i	140.8	173.3	394.2	163.3	195.8	226.7	205.0	232.5				
AP	tCaCO3/1i	0.31	0.31	0.31	2.4	8.7	2.5	3.5	57.8				
Net NP	tCaCO3/1i	141	178	330	163	192	195	180	112				
Sobeck NP/AP	ratio	454	574	1067	68.9	23.1	79.1	51.9	2.9				
Carbonate NP/AP	ratio	454.3	559.2	1271.6	68.1	22.5	90.7	58.6	4.0				
S2-	%	0.068	0.098	0.23	0.15	0.31	0.11	0.13	2.75				
Sulphide	%	<0.01	<0.01	<0.01	0.08	0.28	0.08	0.11	1.85				
SO4	%	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4				
C(t)	%	1.69	2.08	4.73	1.96	2.35	2.72	2.46	2.79				
Carbonate	%	8.16	9.76	21.7	9.29	10.9	12.6	11.7	11.0				



APPENDIX 2

Compilation of Humidity Cell Testing Data

Appendix 2
Compilation of Humidity Cell Test Data

Parameter	SS-1 Day 0	SS-1 Day 7	SS-1 Day 13	SS-1 Day 21	SS-1 Day 28	SS-1 Day 35	SS-1 Day 42	SS-1 Day 49	SS-1 Day 55	SS-1 Day 63	SS-1 Day 70	SS-1 Day 77	SS-1 Day 84	SS-1 Day 91	SS-1 Day 98	SS-1 Day 105	SS-1 Day 112	SS-1 Day 119	SS-1 Day 126	SS-1 Day 133	SS-1 Day 140
Volume Water Added	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Volume Water Recovered	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
pH	1.71	1.04	1.05	0.95	0.99	0.93	0.95	0.98	1.10	0.90	1.00	0.97	0.95	0.97	0.98	0.98	0.98	0.99	1.00	1.00	1.00
Specific Conductance	mS	7.41	7.02	6.93	7.52	6.81	7.45	7.43	7.51	8.02	7.66	7.37	7.72	7.80	7.58	7.14	7.60	7.45	7.51	7.68	7.19
		0.20	0.16	0.17	0.15	0.11	0.17	0.23	0.21	0.15	0.16	0.16	0.04	0.12	0.08	0.09	0.10	0.09	0.15	0.16	0.10
Acidity as CaCO3	mg/L	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Alkalinity as CaCO3	mg/L	76	59	40	38	24	19	55	57	46	63	63	40	40	42	48	44	46	67	50	45
Dissolved Aluminum (Al)	mg/L	0.06	0.11	0.09	0.09	0.09	0.08	0.07	0.09	0.1	0.09	0.09	0.07	0.07	0.06	0.06	0.06	0.06	0.04	0.04	0.05
Dissolved Antimony (Sb)	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Dissolved Arsenic (As)	mg/L	<0.001	0.005	0.005	0.003	0.003	0.004	0.005	0.004	0.004	0.003	0.003	0.002	0.002	0.002	0.001	0.001	0.001	<0.001	<0.001	0.001
Dissolved Barium (Ba)	mg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Dissolved Beryllium (Be)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Bismuth (Bi)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Boron (B)	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dissolved Cadmium (Cd)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Dissolved Calcium (Ca)	mg/L	31.5	20.2	18.8	19.6	11.5	18.1	21.2	19.3	18	21.5	20.4	8.6	13.6	14	16.3	13.5	13.3	22.8	17.5	14.8
Dissolved Chromium (Cr)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Cobalt (Co)	mg/L	<0.005	0.006	0.011	0.001	0.001	0.009	0.013	0.001	0.005	0.001	0.001	<0.005	<0.005	0.007	0.008	0.006	0.007	0.013	0.008	0.006
Dissolved Copper (Cu)	mg/L	0.001	0.001	0.002	<0.001	<0.001	0.001	0.001	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	0.002	0.001	0.002	<0.001	0.001	0.002
Dissolved Iron (Fe)	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dissolved Lead (Pb)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Magnesium (Mg)	mg/L	5.4	13.3	12.8	11.3	6	11	17.5	14.8	13.4	12.6	13	3.7	7.6	7.4	10.3	7.8	7.7	13.6	8.4	7.1
Dissolved Manganese (Mn)	mg/L	0.059	0.052	0.075	0.066	0.041	0.053	0.048	0.034	0.032	0.038	0.039	0.037	0.045	0.051	0.048	0.043	0.046	0.061	0.051	0.047
Dissolved Molybdenum (Mo)	mg/L	0.011	0.01	0.006	0.004	0.002	0.005	0.008	0.006	0.003	0.003	0.002	0.001	0.004	0.002	0.002	0.002	0.002	0.002	0.002	0.001
Dissolved Nickel (Ni)	mg/L	<0.002	0.003	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Dissolved Phosphorus (P)	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dissolved Potassium (K)	mg/L	12.6	10	6	4	3	3	3	3	2	2	2	<1	<1	<1	<1	<1	<1	<1	<1	<1
Dissolved Selenium (Se)	mg/L	0.005	0.017	0.018	0.021	0.019	0.019	0.021	0.011	0.009	0.007	0.007	<0.005	<0.005	<0.005	0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Dissolved Silicon (Si)	mg/L	0.6	1.5	1.6	1.1	0.6	0.3	1	1.1	1	1.3	1.2	0.4	0.5	0.5	0.7	0.6	0.7	0.6	0.7	0.6
Dissolved Silver (Ag)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0003	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Dissolved Sodium (Na)	mg/L	7.4	3.5	1.6	0.7	0.9	<0.5	0.7	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dissolved Strontium (Sr)	mg/L	0.08	0.069	0.057	0.06	0.058	0.072	0.087	0.067	0.059	0.071	0.068	0.022	0.043	0.045	0.051	0.041	0.042	0.069	0.048	0.043
Dissolved Sulphur (S)	mg/L	37	19	16	21	13	28	32	18	18	14	17	5	10	10	11	9	9	14	9	8
Dissolved Thallium (Tl)	mg/L	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Dissolved Tin (Sn)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Titanium (Ti)	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Dissolved Tungsten (W)	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Dissolved Uranium (U)	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Dissolved Vanadium (V)	mg/L	<0.001	0.002	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Zinc (Zn)	mg/L	0.004	0.005	0.01	0.008	0.009	0.011	0.014	0.016	0.007	0.011	0.011	0.003	0.012	0.01	0.011	0.01	0.015	0.017	0.013	0.012
Dissolved Zirconium (Zr)	mg/L	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Sulphate (SO4)	mg/L	111	57	48	63	39	84	96	54	54	42	51	15	30	30	33	27	27	42	27	24

Appendix 2
Compilation of Humidity Cell Test Data

Parameter	FP-1 Day 0	FP-1 Day 7	FP-1 Day 13	FP-1 Day 21	FP-1 Day 28	FP-1 Day 35	FP-1 Day 42	FP-1 Day 49	FP-1 Day 55	FP-1 Day 63	FP-1 Day 70	FP-1 Day 77	FP-1 Day 84	FP-1 Day 91	FP-1 Day 98	FP-1 Day 105	FP-1 Day 112	FP-1 Day 119	FP-1 Day 126	FP-1 Day 133	FP-1 Day 140
Volume Water Added	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Volume Water Recovered	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
pH	8.73	7.49	7.37	6.78	7.46	6.62	7.15	7.50	7.70	7.19	7.37	6.87	7.14	7.32	6.97	7.36	7.34	7.53	7.44	7.59	7.01
Specific Conductance	mS	mS	mS	mS	mS	mS	mS	mS	mS	mS	mS	mS	mS	mS	mS	mS	mS	mS	mS	mS	mS
Acidity as CaCO3	0.05	0.08	0.10	0.08	0.07	0.08	0.10	0.05	0.05	0.04	0.06	0.07	0.03	0.06	0.05	0.06	0.06	0.04	0.07	0.11	0.06
Alkalinity as CaCO3	23	35	46	42	40	28	30	35	27	25	29	30	30	32	35	33	35	30	40	33	33
Dissolved Aluminum (Al)	0.19	0.16	0.1	0.14	0.21	0.18	0.13	0.2	0.35	0.35	0.31	0.32	0.26	0.19	0.22	0.27	0.37	0.29	0.19	0.25	0.27
Dissolved Antimony (Sb)	<0.005	0.008	0.01	0.007	0.008	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Dissolved Arsenic (As)	0.002	0.063	0.078	0.092	0.089	0.055	0.051	0.068	0.079	0.068	0.063	0.058	0.047	0.037	0.04	0.044	0.035	0.035	0.024	0.029	0.027
Dissolved Barium (Ba)	0.02	0.02	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Dissolved Beryllium (Be)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Bismuth (Bi)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Boron (B)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dissolved Cadmium (Cd)	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Dissolved Calcium (Ca)	5.1	6.9	9.2	9	9.7	7.6	9.6	9.3	8.1	7.8	11	10.3	10.4	11.2	11	11.6	11.8	9.2	13.5	12	11.7
Dissolved Chromium (Cr)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Cobalt (Co)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Dissolved Copper (Cu)	0.002	0.002	0.001	<0.001	<0.001	<0.001	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.005	<0.001	<0.001	<0.001	<0.001
Dissolved Iron (Fe)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dissolved Lead (Pb)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Magnesium (Mg)	1.1	2.3	4.3	3.6	3.6	2.5	2.6	2.9	2.6	2.5	2.6	2.5	2.6	2.1	2.3	2.5	2.2	1.7	2.7	1.9	2
Dissolved Manganese (Mn)	0.009	0.025	0.036	0.028	0.028	0.025	0.034	0.032	0.02	0.02	0.038	0.039	0.04	0.047	0.052	0.051	0.058	0.04	0.061	0.055	0.052
Dissolved Molybdenum (Mo)	<0.001	0.003	0.004	0.004	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	0.002	0.002	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Nickel (Ni)	0.005	0.002	0.004	0.004	0.004	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Dissolved Phosphorus (P)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dissolved Potassium (K)	4	6	7	5	4	2	2	2	2	2	2	1	1	1	<1	1	1	<1	<1	<1	<1
Dissolved Selenium (Se)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Dissolved Silicon (Si)	0.7	1	1.7	1.5	1.3	0.8	0.6	1.2	1.3	1.3	1.6	1.4	1.6	1.3	1.5	1.4	1.3	1.3	1.4	1.4	1.4
Dissolved Silver (Ag)	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Dissolved Sodium (Na)	5.2	8.4	10	3.8	1.9	1.2	0.8	0.7	0.6	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.7	<0.5	<0.5	<0.5	<0.5
Dissolved Strontium (Sr)	0.018	0.039	0.06	0.052	0.047	0.036	0.038	0.037	0.027	0.026	0.037	0.036	0.035	0.034	0.035	0.035	0.036	0.029	0.039	0.033	0.031
Dissolved Sulphur (S)	2	4	6	4	4	3	3	2	3	2	2	2	2	1	2	2	2	1	<1.0	2	2
Dissolved Thallium (Tl)	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Dissolved Tin (Sn)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Titanium (Ti)	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Dissolved Tungsten (W)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Dissolved Uranium (U)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Dissolved Vanadium (V)	<0.001	0.001	0.002	0.001	<0.001	<0.001	<0.001	<0.001	0.001	0.001	0.001	0.001	0.001	<0.001	<0.001	0.001	0.001	0.001	0.001	<0.001	<0.001
Dissolved Zinc (Zn)	<0.003	<0.003	<0.003	<0.003	<0.003	0.004	<0.003	<0.003	0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.016	0.007	<0.003	<0.003	<0.003
Dissolved Zirconium (Zr)	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Sulphate (SO4)	6	12	18	12	12	9	9	6	9	6	6	6	6	3	6	6	6	3	<3	6	6

Appendix 2
Compilation of Humidity Cell Test Data

Parameter	Units	FP-2 Day 0	FP-2 Day 7	FP-2 Day 13	FP-2 Day 21	FP-2 Day 28	FP-2 Day 35	FP-2 Day 42	FP-2 Day 49	FP-2 Day 55	FP-2 Day 63	FP-2 Day 70	FP-2 Day 77	FP-2 Day 84	FP-2 Day 91	FP-2 Day 98	FP-2 Day 105	FP-2 Day 112	FP-2 Day 119	FP-2 Day 126	FP-2 Day 133	FP-2 Day 140
Volume Water Added	L	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Volume Water Recovered	L	1.77	0.96	1.05	0.96	1.00	0.90	0.99	0.97	1.10	0.94	1.01	1.00	1.00	1.00	1.00	0.96	1.00	0.99	1.00	1.00	0.96
pH	---	8.87	8.03	7.01	7.45	7.62	6.96	7.70	7.63	7.16	7.28	7.34	7.08	7.34	6.79	7.02	6.65	6.74	6.90	7.26	7.49	7.07
Specific Conductance	mS	0.04	0.08	0.08	0.06	0.08	0.11	0.05	0.05	0.05	0.05	0.06	0.06	0.10	0.09	0.06	0.06	0.08	0.06	0.12	0.10	0.08
Acidity as CaCO3	mg/L	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Alkalinity as CaCO3	mg/L	21	34	31	34	34	32	28	30	33	29	30	29	26	29	32	30	32	29	40	33	32
Dissolved Aluminum (Al)	mg/L	0.18	0.13	0.07	0.12	0.14	0.18	0.11	0.12	0.18	0.19	0.19	0.17	0.14	0.11	0.11	0.12	0.1	0.11	0.08	0.09	0.09
Dissolved Antimony (Sb)	mg/L	<0.005	0.007	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Dissolved Arsenic (As)	mg/L	0.007	0.048	0.05	0.036	0.037	0.043	0.031	0.028	0.035	0.034	0.033	0.029	0.022	0.019	0.017	0.016	0.012	0.01	0.009	0.009	0.009
Dissolved Barium (Ba)	mg/L	0.02	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Dissolved Beryllium (Be)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Bismuth (Bi)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Boron (B)	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dissolved Cadmium (Cd)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0003	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Dissolved Calcium (Ca)	mg/L	5.3	6.3	8	7.1	8.1	7.6	8	7.4	8.8	8.7	9.6	9.6	9.1	9.5	11.1	12.1	14.2	13	22.7	16.4	15.4
Dissolved Chromium (Cr)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Cobalt (Co)	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.006	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Dissolved Copper (Cu)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.001	<0.001
Dissolved Iron (Fe)	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dissolved Lead (Pb)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Magnesium (Mg)	mg/L	1.1	2.4	3.2	2.7	2.9	2.7	2.5	2.2	3.2	2.9	2.4	2.5	2.4	2.1	2.1	2.8	3.2	3	4.8	3.6	3.3
Dissolved Manganese (Mn)	mg/L	0.007	0.03	0.038	0.035	0.036	0.031	0.035	0.034	0.03	0.03	0.037	0.039	0.035	0.042	0.04	0.034	0.03	0.024	0.032	0.026	0.019
Dissolved Molybdenum (Mo)	mg/L	<0.001	0.003	0.003	0.002	<0.001	<0.001	0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Nickel (Ni)	mg/L	<0.002	<0.002	0.002	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Dissolved Phosphorus (P)	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dissolved Potassium (K)	mg/L	4	6	6	4	4	3	1	2	2	2	2	1	1	1	1	1	1	<1	1	<1	<1
Dissolved Selenium (Se)	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Dissolved Silicon (Si)	mg/L	0.7	0.9	1.2	1	0.9	0.9	0.5	0.7	1.1	1.1	1.2	1.1	1	1	1	1	1	1.1	1.2	1.1	1.1
Dissolved Silver (Ag)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Dissolved Sodium (Na)	mg/L	5.4	7.6	6.5	3.2	2.3	1.4	0.7	0.8	0.9	0.6	0.5	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dissolved Strontium (Sr)	mg/L	0.018	0.038	0.046	0.038	0.042	0.038	0.025	0.029	0.031	0.033	0.032	0.033	0.033	0.032	0.033	0.037	0.043	0.042	0.063	0.045	0.042
Dissolved Sulphur (S)	mg/L	3	5	5	3	3	3	3	1	2	2	1	2	1	2	2	4	7	7	11	8	8
Dissolved Thallium (Tl)	mg/L	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Dissolved Tin (Sn)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Titanium (Ti)	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Dissolved Tungsten (W)	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Dissolved Uranium (U)	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Dissolved Vanadium (V)	mg/L	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Dissolved Zinc (Zn)	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.004	0.004	0.005	0.004	0.009	0.004	<0.003	<0.003
Dissolved Zirconium (Zr)	mg/L	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Sulphate (SO4)	mg/L	9	15	15	9	9	9	9	3	6	6	3	6	3	6	6	12	21	21	33	24	24

Appendix 2
Compilation of Humidity Cell Test Data

Parameter	VM-2 Day 0	VM-2 Day 7	VM-2 Day 13	VM-2 Day 21	VM-2 Day 28	VM-2 Day 35	VM-2 Day 42	VM-2 Day 49	VM-2 Day 55	VM-2 Day 63	VM-2 Day 70	VM-2 Day 77	VM-2 Day 84	VM-2 Day 91	VM-2 Day 98	VM-2 Day 105	VM-2 Day 112	VM-2 Day 119	VM-2 Day 126	VM-2 Day 133	VM-2 Day 140
Volume Water Added	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Volume Water Recovered	1.75	1.06	1.02	1.00	0.98	0.95	1.02	0.93	0.78	0.93	0.99	0.99	1.00	1.00	0.99	1.00	1.05	0.95	0.90	1.00	1.01
pH	8.60	7.40	7.52	7.45	7.84	7.22	7.67	7.93	8.05	8.16	8.08	7.36	7.53	6.83	7.45	7.21	7.62	7.60	7.54	7.74	7.36
Specific Conductance	0.06	0.09	0.07	0.08	0.07	0.13	0.07	0.07	0.07	0.05	0.06	0.05	0.04	0.08	0.06	0.06	0.07	0.05	0.10	0.08	0.06
Acidity as CaCO3	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Alkalinity as CaCO3	27	49	40	51	47	49	40	44	21	27	33	30	30	38	40	42	40	44	57	44	39
Dissolved Aluminum (Al)	0.15	0.19	0.24	0.27	0.33	0.38	0.26	0.31	0.17	0.19	0.21	0.19	0.17	0.17	0.19	0.22	0.24	0.29	0.18	0.21	0.23
Dissolved Antimony (Sb)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Dissolved Arsenic (As)	0.007	0.007	0.008	0.011	0.009	0.011	0.014	0.015	0.008	0.011	0.014	0.013	0.013	0.013	0.015	0.016	0.015	0.014	0.011	0.011	0.011
Dissolved Barium (Ba)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Dissolved Beryllium (Be)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Bismuth (Bi)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Boron (B)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dissolved Cadmium (Cd)	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Dissolved Calcium (Ca)	7.3	7.7	8.3	9.4	9.4	10.1	10.9	10.2	6.3	8.8	9.8	9.5	9.5	10.3	10.6	11.7	11.2	9.7	15.1	12.2	11.2
Dissolved Chromium (Cr)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Cobalt (Co)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Dissolved Copper (Cu)	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Iron (Fe)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dissolved Lead (Pb)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Magnesium (Mg)	1.4	6.1	6	7	6.4	5.9	4.8	5.4	1.8	4	4	4	4.3	3.7	4.1	5.2	4.3	4.3	6.5	4.3	4.4
Dissolved Manganese (Mn)	0.004	0.011	0.013	0.01	0.01	0.011	0.015	0.012	0.009	0.013	0.016	0.019	0.019	0.02	0.02	0.022	0.02	0.014	0.021	0.019	0.017
Dissolved Molybdenum (Mo)	<0.001	0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.002	0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Nickel (Ni)	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Dissolved Phosphorus (P)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dissolved Potassium (K)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Dissolved Selenium (Se)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Dissolved Silicon (Si)	0.4	0.9	1.1	1.3	0.9	0.9	0.6	1	0.3	0.7	0.8	0.7	0.8	0.7	0.8	1	0.9	1	0.9	0.9	0.9
Dissolved Silver (Ag)	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Dissolved Sodium (Na)	7.9	5.6	3	2	1.3	1.2	0.8	0.6	<0.5	<0.5	<0.5	<0.5	0.6	<0.5	<0.5	0.025	<0.5	<0.5	<0.5	<0.5	<0.5
Dissolved Strontium (Sr)	0.014	0.032	0.03	0.033	0.029	0.029	0.026	0.026	0.011	0.018	0.021	0.02	0.02	0.022	0.023	0.025	0.023	0.023	0.03	0.022	0.02
Dissolved Sulphur (S)	3	2	3	3	3	3	3	3	<1.0	2	2	2	2	2	2	2	2	2	<1.0	2	2
Dissolved Thallium (Tl)	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Dissolved Tin (Sn)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Titanium (Ti)	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Dissolved Tungsten (W)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Dissolved Uranium (U)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Dissolved Vanadium (V)	<0.001	0.002	0.002	0.002	0.001	0.001	0.006	0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	0.001	0.001	0.001	<0.001	<0.001	<0.001
Dissolved Zinc (Zn)	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.004	<0.003	<0.003	<0.003	<0.003	0.004	<0.003	<0.003	<0.003	0.007	<0.003	<0.003	<0.003
Dissolved Zirconium (Zr)	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Sulphate (SO4)	9	6	9	9	9	9	9	9	3	6	6	6	6	6	6	6	6	3	<3	6	6