

TECHNICAL MEMORANDUM

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		File No.	017
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Subject	Baffinland Mary River Project – Trucking Feasibility Study Interim ML/ARD Assessment of Tote Road Quarry and Borrow Pit Samples Rev1 – Issued for DEIS		

1.0 INTRODUCTION

AMEC was retained by Baffinland Iron Mines Corporation (Baffinland) to conduct environmental studies in support of an environmental impact assessment (EIA). As part of the supporting environmental studies, AMEC assessed the metal leaching and acid rock drainage (ML/ARD) characteristics of rock samples to support future borrow pit and quarry development along the proposed Milne Inlet Tote Road alignment upgrade.

Drill core and unconsolidated surficial materials were collected from potential quarry and borrow pit locations along the Tote Road alignment during a geotechnical investigation aggregate sourcing program. AMEC submitted selected samples to SGS Mineral Services (SGS) of Lakefield for geochemical analyses on the potential quarry and borrow pit materials. This memo reports on a screening level ML/ARD assessment of these materials.

2.0 SITE DESCRIPTION

The Mary River Project is located in the northern region of Baffin Island in Nunavut territory, Canada. This area experiences a mean annual temperature of approximately -12°C and monthly averages below -20°C from December to March. Above freezing temperatures occur only from June to August, with an average high of 4.4°C in July.

The existing all-season Milne Inlet Tote Road (Tote Road) is currently undergoing design for the purpose of upgrades for the transportation of ore from the mine site to Milne Inlet. The road was originally established in the 1960's and runs approximately 107 km from the Mary River exploration camp to Milne Inlet.

The majority of the Tote Road alignment follows the valley of Phillips Creek which is bounded by steep ridges located on either side of the road corridor.

Regional geologic mapping is available for the entire route of the Tote Road (Scott and de Kemp, 1998). Approximately the first 20 km of the Tote Road from Milne Inlet passes through Precambrian terrane. The middle 73 km of the road travels across relatively flat lying Paleozoic rocks and the final 14 km of the road to the Mary River site again passes through Precambrian terrane near the boundary with the Paleozoic units.

Paleozoic rocks along the route include the Cambrian-Ordovician age Gallery and Turner Cliffs Formations, the Ordovician age Ship Point Formation, and the Ordovician Silurian age Baillarge Formation. The Gallery Formation is ~340 m thick medium to coarse grained quartzose sandstone with minor siltstone, conglomerate and shale, and rare breccia, dolomitic sandstone and dolostone. The Turner Cliffs Formation is an approximately 310 m thick shaly to pure dolostone unit with intra-beds of dolomitic clastic sedimentary rocks. The Ship Point Formation is a 50 to 275 m thick finely crystalline dolostone that is commonly silty or sandy and interbedded with clastic dolomitic rocks. The formation is resistant and forms prominent cliffs in the area. The Baillarge Formation is an ~490 m thick unit of fine-grained limestones interbedded with minor dolostone, breccia, conglomerate, sandstone and cherty beds, and is often fossiliferous.

The Precambrian rocks are interpreted to be Archean age migmatitic gneisses in the region between Milne Inlet and the Paleozoic rocks and again between the Paleozoic sediments and the Mary River site. The migmatitic gneisses are heterogeneous commonly with inclusions and bands of mafic, metasedimentary and other granitic rocks. Archean Mary River Group rocks are present in close proximity to the migmatites along the route near the Mary River site. Mary River Group rocks consist mainly of siliciclastic sedimentary and mafic volcanic rocks. The Mary River Group hosts the Algoman-type iron formation deposits at the site.

3.0 METHODS

3.1 Sampling

During the autumn of 2010, AMEC conducted a geotechnical investigation of proposed quarry and borrow pit locations along the Tote Road alignment. The investigation included the collection of drill core from the quarry locations and the collection of unconsolidated material from borrow pit locations. .

3.2 Sample Selection for Testing

The objective in sample selection for ML/ARD characterization was to collect a set of samples for analysis which are representative of the geochemical variation of the different soil and rock types that will be used as quarry and borrow material for the Tote Road upgrade. Samples were selected from drill core and from the collected borrow pit material.

Intervals for rock sample selection were identified by AMEC after reviewing available drill logs, photographs and following direct inspection of the core. The strategy for sample selection and collection was based upon the guidance found within the document *Prediction Manual for Drainage Chemistry from Sulphidic Geologic Materials* (MEND 2009). Borehole locations and observed rock types are tabulated below.

Regional Mapped Geology and Borehole Rock Type

Regional Mapped Geology*	Borehole Number	Approximate Tote Road Chainage	Rock Type
Archean Migmatitic Gneiss	BH-10-04	2+100	Granitic Gneiss
	BH-10-05	3+100	Granitic Gneiss
	BH-10-06	4+100	Granitic Gneiss
	BH-10-07	5+000	Granitic Gneiss
	BH-10-08	6+000	Granitic Gneiss
	BH-10-09	7+000	Granitic Gneiss
	BH-10-12	22+000	Granitic Gneiss
Cambrian-Ordovician Gallery or Turner Cliffs Formation	BH-10-13	39+100	Carbonate bound quartz sandstone with silty interlayers
	BH-10-14	45+200	Sandy carbonate
	BH-10-15	50+000	Carbonate with minor shale and mudstone
	BH-10-16	61+500	Carbonate
Archean Migmatitic Gneiss	BH-10-21	85+000	Schist with pegmatite veining

* Scott and de Kemp, 1998

The drill core and material from 14 of the 15 borrow pits were shipped from the site to AMEC offices in Hamilton Ontario where the samples were split for ML/ARD analyses and aggregate testing. For the purposes of ML/ARD characterization, three sections of 1 m lengths of drill core

were selected from each of the 12 boreholes. The 1 m lengths of core were split in half with half retained and half submitted for geochemical analysis.

Borrow pit material was crushed and screened to <20 mm. The unconsolidated material from the borrow pits was then split such that approximately two kilograms of each sample was sent for geochemical analyses. The remainder of the borrow pit material and the remainder of quarry material will be used for aggregate source material testing presently underway.

The drill core samples selected represented 21 samples of gneiss and three samples of schist from the Precambrian units, and 12 samples of clastic and carbonate sedimentary rocks from the Paleozoic units. The borrow pit materials were typically sand or silty sand with varying quantities of gravel cobbles and boulders. Some had finer grained material as well as occasional small boulders. Cobbles and boulders in the samples generally consisted of carbonate or gneiss.

Visual inspection of the Precambrian core during the sample collection indicated the rare presence of sulphide minerals, primarily on fractured surfaces. No visible sulphide minerals were observed during inspection of the Paleozoic rock core samples at the time of sample selection. However, there was some iron staining noted in some samples.

3.3 Testing Methods

Split samples were shipped to SGS Lakefield for analysis. Testing methodologies followed those described in MEND (2009).

Analytical tests conducted included:

- Acid base accounting (ABA), including paste pH, modified Sobek neutralization potential (NP), total sulphur, sulphate sulphur, sulphide sulphur by difference, total carbon (TC) and total inorganic carbon (TIC);
- Total metals analysis by aqua regia digestion with ICP-MS finish;
- Leachable metals by shake flask extraction (SFE); and
- Mineralogy by X-ray diffraction (XRD) with Rietveld refinement.

Each sample was analysed for ABA and total metals. Testing by SFE and XRD were performed on a subset of samples, selected from the initial sample set. Considering project time-lines, the subset was selected prior to completion of the ABA and metals analyses. The subset was selected to best represent the entire sample set using the data available at the time.

4.0 GEOCHEMICAL TESTING RESULTS

4.1 Acid Base Accounting (ABA)

Results of ABA testing are summarized in Figures 1 and 2, with complete results presented in Table 1. A statistical summary of the results presented in Table 2. Results for rock samples are subdivided by lithology.

Figure 1 shows the relationship between modified Sobek NP and carbonate NP (CaNP) and indicates that carbonate minerals are the main source of NP in the sedimentary rocks and unconsolidated borrow pit materials. Non-carbonate minerals appear to be the primary source of NP for the schist and gneiss samples (Figure 1).

For the purposes of this screening level assessment, the calculated acid potential of the samples has been conservatively based on the total sulphur content, and is referred to as the maximum potential acidity (MPA) (Figure 2).

Overall findings of the results are summarized as follows:

- Paste pH of all samples were weakly alkaline. Carbonate rocks had a median paste pH of 8.3), whereas the schist and gneiss samples had the higher paste pH with a median of 9.8). Borrow pit materials reported a median paste pH of 8.9.
- Sulphide content of all samples was very low with the maximum concentrations ranging from 0.04% in carbonate sedimentary rocks to 0.02% in schist and 0.01% in gneiss and unconsolidated borrow pit materials.
- All samples had neutralization potential ratios (NPR) well in excess of 2 based on the more conservative MPA (Figure 2). These materials are considered non potentially acid generating (non-PAG).
- Gneiss and schist samples exhibited low NP values (median 8 and 10 kg CaCO_3/t respectively).
- Carbonate rich sedimentary rocks exhibited high NP (median carbonate NP of 890 kg CaCO_3/t).
- Unconsolidated materials had a generally high NP with most samples reporting >100 kg CaCO_3/t (median CaNP of 218 kg CaCO_3/t). However, the lowest NP of the sample set (5 kg CaCO_3/t) was from an unconsolidated borrow pit sample.

4.2 Metals Analyses

4.2.1 Total Metals

In order to identify metals of potential environmental significance, total metals results were compared to average continental crustal abundances (Price 1997). For screening purposes the concentration of an element was considered enriched if concentrations were greater than ten times the average crustal abundance. Metal results are presented in Table 3 and a statistical summary is provided in Table 4. It should be noted that the total concentration of an element does not determine the metal leaching potential of that element.

In general, the quarry and borrow pit samples demonstrated no notable elevation of elements relative to the average composition of the continental crust. However, the MDL values for bismuth and selenium were greater than ten times the average continental crust values. Therefore, any detectable values for bismuth or selenium were above ten times the average continental concentration.

4.2.2 Shake Flask Extraction Test

Eleven samples representing the three different rock types and four samples of unconsolidated borrow material underwent Shake Flask Extraction (SFE) testing. The SFE testing (Table 5) were compared to Metal Mining Effluent Regulation values (MMER, 2002). More stringent guideline values are also provided for reference purposes only. Guidelines for the protection of aquatic life and the drinking water guidelines (CWQG-PAL and CDWG guidelines in Table 5), which are focused on the preservation of water quality in the receiving waterbody for specific receptors (i.e., aquatic life, drinking water) are conservative since these values represent concentrations at point of use or exposure, not point of discharge. These guidelines are useful to identify parameters of interest when evaluating final discharge to receiving waters.

Results of SFE analyses (Table 5) for all samples, had a final pH that was neutral to alkaline with generally low concentrations of metals and no exceedances of MMER limits. The pH in SFE leachates for a number of these samples exceeded the MMER limit of 9.5. This is not unexpected for freshly exposed rock materials under agitation and at the high solid-solution ratios of the test. The high pH (and corresponding elevated aluminum concentrations) were likely related to the weak alkalinity associated with aluminosilicate mineral dissolution. It is unlikely the elevated pH (and associated aluminum) will be observed under field conditions. A single borrow material sample had an elevated copper concentration in comparison to the rest of the sample set. However, the concentration was an order of magnitude lower than the MMER limit.

4.3 Mineralogy

Rietveld XRD analysis was completed on 15 selected quarry and unconsolidated borrow pit samples. Results are presented in Table 6. The Rietveld method is effective at identifying crystalline phases present in abundance greater than a few weight percent. Lower abundances can be quantified where favourable scattering properties exist.

There were no acid producing sulphide minerals identified by XRD in the quarry or borrow pit samples, which is consistent with the low AP of all samples analysed. There were carbonate minerals identified in most of the samples.

Calcite was identified at low weight percent to trace values (<1.2%) in all but one of the granitic gneiss samples. Trace amounts of dolomite and rhodocrosite were also identified in a single granitic gneiss sample along with similarly low calcite. No carbonates were identified in one granitic gneiss sample and the single schist sample analysed.

Calcite was the dominant mineral (>98 wt.%) identified in the three carbonate samples. Trace dolomite and ankerite were also identified in these samples. In the carbonate cemented sandstone, dolomite (approximately 26%) was the only carbonate mineral identified.

Calcite, dolomite and ankerite were identified in most of the borrow material samples. Rhodocrosite was also identified in one sample. In the fourth sample the only carbonate mineral identified was calcite at very low weight percent (0.2%).

Calcite and dolomite have effective acid neutralizing properties, while the neutralizing ability of iron and manganese bearing carbonate minerals such as ankerite and rhodocrosite is uncertain. Dissolution rates of these minerals may be slower and under oxidizing conditions, hydrolysis of the iron and manganese released leads to no net neutralization. However, for this sample set the iron and manganese carbonates, when present, are always in low abundance compared to calcite and dolomite. Therefore, the presence of these minerals in this case will have only a minor influence on the neutralization potential of the materials.

5.0 CONCLUSIONS

Lithologically-based ML/ARD assessments have been completed on selected quarry and borrow materials along the Tote Road. Based on the results of this assessment, the following conclusions are made:

- The materials investigated in the proposed quarries and borrow pits along the Tote Road route appear to have a low potential for ML/ARD and are expected to be suitable as quarry or borrow sources. However, individual quarry and borrow sites should be

subjected to additional site specific ML/ARD characterization with consideration given for additional assessment depending upon the tonnages to be used and anticipated geological variability.

- The relatively low NP in the Precambrian rocks suggests that the presence of low contents of sulphide could potentially result in ML/ARD conditions. Diligence through adequate levels of sampling and monitoring during extraction operations will be necessary to ensure that the low concentrations of sulphide observed in this study are confirmed elsewhere.
- Paleozoic sedimentary rocks selected as potential quarry sources in this study are all carbonate rich and pose no ML/ARD risk. However, other non-carbonate sedimentary rocks are present in the region, so caution should be exercised should other quarry locations in the Paleozoic region be selected.
- Rietveld XRD results are consistent with ABA data for the rock-types analysed. Calcite or dolomite is confirmed to be in abundance in all carbonate rich samples and low to trace carbonate minerals are present in the granitic gneiss samples. For the gneiss samples neutralization from silicate minerals present in greater abundance than the carbonates is inferred.
- Borrow materials tested have high NPR values and pose no apparent ML/ARD risk.
- Carbonate as calcite and dolomite appear to be common components in most borrow materials tested; however, one sample was identified that was carbonate poor and quartz rich, thus having very low NP and suggesting not all borrow sources will have high carbonate NP.
- Ankerite and rhodocrosite were sometimes identified in carbonate-bearing samples, suggesting a portion of the carbonate content may not contribute to neutralization under oxidizing conditions. However, these carbonate forms were always subordinate to calcite or dolomite.

6.0 FUTURE WORK

The following work is planned and proposed.

- Continued collection and analysis of material from any future drilling or excavation programs along the Tote Road alignment to the extent necessary to minimize risk of ML/ARD.

7.0 REFERENCES

Canadian Council of Ministers of the Environment. 2007, Canadian Water Quality Guidelines for the Protection of Aquatic Life.

Health Canada. 2008, Guidelines for Canadian Drinking Water Quality.

MMER. 2002. Metal Mine Effluent Regulations SOR/2002-222.

MEND 2009, Prediction Manual for Drainage Chemistry from Sulphidic Geologic Materials.
Natural Resources Canada.

Price, W.A., 1997. Draft Guidelines and Recommended Methods for the Prediction of Metal Leaching and Acid Rock Drainage at Minesites in British Columbia.

Scott, D.J. and de Kemp, E.A. Bedrock geology compilation, northern Baffin Island and northern Melville Peninsula, North West Territories; Geological Survey of Canada, Open File, 3633, scale 1:500,000.

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Attachments:

Table 1 — Acid Base Accounting Results

Table 2 — Acid Base Accounting Statistics

Table 3 — Total Metals Results

Table 4 — Total Metals Statistics

Table 5 — Shake Flask Analysis Results

Table 6 — Rietveld Quantitative Analysis X-ray Diffraction Results

Figure 1 — ABA Results - CaNP vs. NP

Figure 2 — ABA Results – NP vs. MPA

TABLES

**Table 1 Acid Base
Accounting Results**

Sample ID	Drill Log Lithology	Sample weight(g)	HCl added mL	HCl Normality	NaOH Normality	NaOH to pH=8.3 mL	Final pH units	Fizz Rate ---	Paste pH units
10-TR-001 BH10-04	gneiss	2.05	20.00	0.10	0.10	16.77	1.36	1	9.56
10-TR-002 BH10-04	gneiss	2.01	20.00	0.10	0.10	16.75	1.39	1	9.92
10-TR-003 BH10-04	gneiss	1.98	20.00	0.10	0.10	16.50	1.39	1	9.58
10-TR-004 BH10-05	gneiss	2.03	20.00	0.10	0.10	17.00	1.40	1	9.79
10-TR-005 BH10-05	gneiss	1.97	20.00	0.10	0.10	17.41	1.38	1	9.76
10-TR-006 BH10-05	gneiss	2.03	20.00	0.10	0.10	17.48	1.38	1	9.73
10-TR-007 BH10-06	gneiss	1.98	20.00	0.10	0.10	17.03	1.39	1	9.78
10-TR-008 BH10-06	gneiss	2.01	20.00	0.10	0.10	17.05	1.42	1	9.65
10-TR-009 BH10-06	gneiss	1.98	20.00	0.10	0.10	16.95	1.41	1	9.90
10-TR-010 BH10-07	gneiss	2.00	20.00	0.10	0.10	16.18	1.46	1	9.98
10-TR-011 BH10-07	gneiss	1.98	20.00	0.10	0.10	15.37	1.50	1	9.66
10-TR-012 BH10-07	gneiss	1.96	20.00	0.10	0.10	15.48	1.43	1	9.90
10-TR-013 BH10-08	gneiss	2.00	20.00	0.10	0.10	17.47	1.38	1	9.68
10-TR-014 BH10-08	gneiss	2.04	20.00	0.10	0.10	16.10	1.44	1	9.46
10-TR-015 BH10-08	gneiss	2.04	20.00	0.10	0.10	15.75	1.46	1	9.52
10-TR-016 BH10-09	gneiss	1.98	20.00	0.10	0.10	17.53	1.40	1	10.00
10-TR-017 BH10-09	gneiss	2.04	20.00	0.10	0.10	17.10	1.41	1	9.91
10-TR-018 BH10-09	gneiss	1.99	20.00	0.10	0.10	17.36	1.37	1	9.99
10-TR-019 BH10-12	gneiss	2.05	20.00	0.10	0.10	16.74	1.42	1	9.94
10-TR-020 BH10-12	gneiss	1.98	20.00	0.10	0.10	15.89	1.44	1	9.93
10-TR-021 BH10-12	gneiss	2.04	20.00	0.10	0.10	16.43	1.42	1	9.84
10-TR-034 BH10-21	schist	1.97	20.00	0.10	0.10	15.09	1.26	2	9.97
10-TR-035 BH10-12	schist	2.02	20.00	0.10	0.10	15.86	1.26	1	9.80
10-TR-036 BH10-12	schist	2.03	20.00	0.10	0.10	15.76	1.17	1	9.67
10-TR-022 BH10-13	sandstone	2.01	118.20	0.10	0.10	26.10	1.70	3	9.43
10-TR-023 BH10-13	sandstone	2.00	127.75	0.10	0.10	27.00	1.76	3	9.34
10-TR-024 BH10-13	sandstone	1.95	135.60	0.10	0.10	29.10	1.75	3	9.38
10-TR-025 BH10-14	sandy carbonate	2.03	589.90	0.10	0.10	200	1.51	4	8.27
10-TR-026 BH10-14	sandy carbonate	2.02	643.90	0.10	0.10	268	1.52	4	8.07
10-TR-027 BH10-14	sandy carbonate	2.00	641.20	0.10	0.10	259	1.50	4	8.22
10-TR-028 BH10-15	carbonate	1.97	685.90	0.10	0.10	301	1.50	4	8.22
10-TR-029 BH10-15	carbonate	1.96	640.00	0.10	0.10	266	1.50	4	8.38
10-TR-030 BH10-15	carbonate	1.98	490.00	0.10	0.10	116	1.71	4	8.23
10-TR-031 BH10-16	carbonate	1.99	490.00	0.10	0.10	106	1.74	4	8.23
10-TR-032 BH10-16	carbonate	1.98	474.20	0.10	0.10	93.80	1.78	4	8.27
10-TR-033 BH10-16	carbonate	1.96	470.00	0.10	0.10	96.20	1.76	4	8.26
S449-10	sand/gravel	2.00	393.20	0.10	0.10	122	1.60	4	8.75
S450-10	sand/gravel	2.01	338.10	0.10	0.10	57.00	1.85	4	8.38
S451-10	sand/gravel	1.97	131.70	0.10	0.10	38.20	1.55	4	8.55
S452-10	sand/gravel	1.97	146.40	0.10	0.10	48.00	1.59	4	8.97
S453-10	sand/gravel	1.99	135.30	0.10	0.10	29.10	1.69	4	8.87
S454-10	sand/gravel	1.95	20.00	0.10	0.10	17.94	1.11	1	8.42
S455-10	sand/gravel	1.96	26.00	0.10	0.10	11.31	1.57	1	9.51
S456-10	sand/gravel	1.97	79.10	0.10	0.10	20.21	1.75	3	8.99
S457-10	sand/gravel	2.00	83.90	0.10	0.10	15.24	1.85	3	9.07
S458-10	sand/gravel	1.97	55.40	0.10	0.10	21.25	1.58	3	9.24
S459-10	sand/gravel	2.03	154.20	0.10	0.10	28.60	1.83	4	8.86
S460-10	sand/gravel	1.96	77.40	0.10	0.10	23.81	1.65	4	8.93
S461-10	sand/gravel	1.99	97.90	0.10	0.10	21.30	1.78	3	9.14
S462-10	sand/gravel	2.01	153.10	0.10	0.10	28.40	1.82	3	8.95

**Table 1 Acid Base
Accounting Results (Continued)**

Sample ID	Drill Log Lithology	Total Carbon %	CO3 %	Total Sulphur %	Sulphate Sulphur %	Sulphide Sulphur %	Neutralization Potential kg CaCO ₃ /t	Acid Potential kg CaCO ₃ /t
10-TR-001 BH10-04	gneiss	0.059	0.103	0.014	0.01	<0.01	7.9	0.31
10-TR-002 BH10-04	gneiss	0.050	0.101	<0.005	<0.01	<0.01	8.1	0.31
10-TR-003 BH10-04	gneiss	0.064	0.137	<0.005	<0.01	<0.01	8.8	0.31
10-TR-004 BH10-05	gneiss	0.041	0.059	0.020	0.02	<0.01	7.4	0.31
10-TR-005 BH10-05	gneiss	0.032	0.033	0.015	0.01	<0.01	6.6	0.31
10-TR-006 BH10-05	gneiss	0.029	0.028	0.038	0.02	0.01	6.2	0.44
10-TR-007 BH10-06	gneiss	0.036	0.048	<0.005	<0.01	<0.01	7.5	0.31
10-TR-008 BH10-06	gneiss	0.028	0.025	0.008	<0.01	<0.01	7.3	0.31
10-TR-009 BH10-06	gneiss	0.035	0.075	0.006	<0.01	<0.01	7.7	0.31
10-TR-010 BH10-07	gneiss	0.027	0.014	0.035	0.02	0.01	9.5	0.36
10-TR-011 BH10-07	gneiss	0.038	0.027	0.036	0.04	<0.01	11.7	0.31
10-TR-012 BH10-07	gneiss	0.036	0.052	0.019	0.02	<0.01	11.5	0.31
10-TR-013 BH10-08	gneiss	0.028	0.035	<0.005	<0.01	<0.01	6.3	0.31
10-TR-014 BH10-08	gneiss	0.044	0.380	0.020	0.02	<0.01	9.6	0.31
10-TR-015 BH10-08	gneiss	0.043	0.062	0.028	0.03	<0.01	10.4	0.31
10-TR-016 BH10-09	gneiss	0.020	0.034	0.012	0.01	<0.01	6.2	0.31
10-TR-017 BH10-09	gneiss	0.070	0.048	0.012	0.01	<0.01	7.1	0.31
10-TR-018 BH10-09	gneiss	0.023	<0.005	0.038	0.04	<0.01	6.6	0.31
10-TR-019 BH10-12	gneiss	0.035	0.018	0.029	0.03	<0.01	8.0	0.31
10-TR-020 BH10-12	gneiss	0.051	0.071	0.028	0.02	0.01	10.4	0.40
10-TR-021 BH10-12	gneiss	0.046	0.065	0.006	<0.01	<0.01	8.8	0.31
10-TR-034 BH10-21	schist	0.096	0.282	0.015	0.02	<0.01	12.5	0.31
10-TR-035 BH10-12	schist	0.052	0.054	0.060	0.04	0.02	10.2	0.77
10-TR-036 BH10-12	schist	0.049	0.023	0.023	0.01	0.01	10.4	0.41
10-TR-022 BH10-13	sandstone	2.77	12.0	<0.005	<0.01	<0.01	229	0.31
10-TR-023 BH10-13	sandstone	2.98	12.5	<0.005	<0.01	<0.01	252	0.31
10-TR-024 BH10-13	sandstone	3.25	14.0	<0.005	<0.01	<0.01	273	0.31
10-TR-025 BH10-14	sandy carbonate	11.1	54.3	<0.005	<0.01	<0.01	959	0.31
10-TR-026 BH10-14	sandy carbonate	10.8	52.3	<0.005	<0.01	<0.01	930	0.31
10-TR-027 BH10-14	sandy carbonate	11.2	54.0	0.071	0.03	0.04	956	1.29
10-TR-028 BH10-15	carbonate	10.9	53.2	0.014	0.01	<0.01	978	0.31
10-TR-029 BH10-15	carbonate	10.7	51.3	0.041	0.02	0.02	953	0.77
10-TR-030 BH10-15	carbonate	10.7	51.5	0.020	<0.01	0.01	945	0.34
10-TR-031 BH10-16	carbonate	10.8	53.5	<0.005	<0.01	<0.01	965	0.31
10-TR-032 BH10-16	carbonate	10.7	52.9	<0.005	<0.01	<0.01	961	0.31
10-TR-033 BH10-16	carbonate	10.7	52.1	<0.005	<0.01	<0.01	954	0.31
S449-10	sand/gravel	7.86	33.9	0.011	0.01	<0.01	678	0.31
S450-10	sand/gravel	8.02	36.0	<0.005	<0.01	<0.01	699	0.31
S451-10	sand/gravel	2.92	11.7	<0.005	<0.01	<0.01	237	0.31
S452-10	sand/gravel	2.89	12.4	0.014	0.01	<0.01	250	0.31
S453-10	sand/gravel	3.22	13.9	<0.005	<0.01	<0.01	267	0.31
S454-10	sand/gravel	0.061	0.016	<0.005	<0.01	<0.01	5.3	0.31
S455-10	sand/gravel	0.410	0.255	<0.005	<0.01	<0.01	37.5	0.31
S456-10	sand/gravel	1.82	6.20	0.007	<0.01	<0.01	150	0.31
S457-10	sand/gravel	1.44	5.37	<0.005	<0.01	<0.01	172	0.31
S458-10	sand/gravel	1.12	4.17	0.007	<0.01	<0.01	86.7	0.31
S459-10	sand/gravel	3.87	16.2	<0.005	<0.01	<0.01	309	0.31
S460-10	sand/gravel	1.71	7.29	<0.005	<0.01	<0.01	137	0.31
S461-10	sand/gravel	2.33	10.2	0.005	<0.01	<0.01	192	0.31
S462-10	sand/gravel	3.75	16.7	0.007	<0.01	<0.01	310	0.31

**Table 1 Acid Base
Accounting Results (Continued)**

Sample ID	Drill Log Lithology	Maximum Potential Acidity kg CaCO ₃ /t	Carbonate Neutralization Potential kg CaCO ₃ /t	Ratio NP/AP ratio	Ratio NP/MPA ratio	Ratio CaNP/AP ratio	Net NP kg CaCO ₃ /t
10-TR-001 BH10-04	gneiss	0.44	4.92	25.5	18.1	15.9	7.59
10-TR-002 BH10-04	gneiss	0.16	4.17	26.1	51.8	13.4	7.79
10-TR-003 BH10-04	gneiss	0.16	5.33	28.4	56.3	17.2	8.49
10-TR-004 BH10-05	gneiss	0.63	3.42	23.9	11.8	11.0	7.09
10-TR-005 BH10-05	gneiss	0.47	2.67	21.3	14.1	8.6	6.29
10-TR-006 BH10-05	gneiss	1.19	2.42	14.2	5.2	5.5	5.76
10-TR-007 BH10-06	gneiss	0.16	3.00	24.2	48.0	9.7	7.19
10-TR-008 BH10-06	gneiss	0.25	2.33	23.5	29.2	7.5	6.99
10-TR-009 BH10-06	gneiss	0.19	2.92	24.8	41.1	9.4	7.39
10-TR-010 BH10-07	gneiss	1.09	2.25	26.2	8.7	6.3	9.14
10-TR-011 BH10-07	gneiss	1.13	3.17	37.7	10.4	10.2	11.4
10-TR-012 BH10-07	gneiss	0.59	3.00	37.1	19.4	9.7	11.2
10-TR-013 BH10-08	gneiss	0.16	2.33	20.3	40.3	7.5	5.99
10-TR-014 BH10-08	gneiss	0.63	3.67	31.0	15.4	11.8	9.29
10-TR-015 BH10-08	gneiss	0.88	3.58	33.5	11.9	11.6	10.1
10-TR-016 BH10-09	gneiss	0.38	1.67	20.0	16.5	5.4	5.89
10-TR-017 BH10-09	gneiss	0.38	5.83	22.9	18.9	18.8	6.79
10-TR-018 BH10-09	gneiss	1.19	1.92	21.3	5.6	6.2	6.29
10-TR-019 BH10-12	gneiss	0.91	2.92	25.8	8.8	9.4	7.69
10-TR-020 BH10-12	gneiss	0.88	4.25	26.0	11.9	10.6	10.0
10-TR-021 BH10-12	gneiss	0.19	3.83	28.4	46.9	12.4	8.49
10-TR-034 BH10-21	schist	0.47	8.00	40.3	26.7	25.8	12.2
10-TR-035 BH10-12	schist	1.88	4.33	13.3	5.4	5.6	9.43
10-TR-036 BH10-12	schist	0.72	4.08	25.6	14.5	10.0	9.99
10-TR-022 BH10-13	sandstone	0.16	230.85	739	1465.6	744.7	229
10-TR-023 BH10-13	sandstone	0.16	248.35	813	1612.8	801.1	252
10-TR-024 BH10-13	sandstone	0.16	270.85	881	1747.2	873.7	273
10-TR-025 BH10-14	sandy carbonate	0.16	925.06	3095	6137.6	2984.1	959
10-TR-026 BH10-14	sandy carbonate	0.16	900.06	2998	5952.0	2903.4	929
10-TR-027 BH10-14	sandy carbonate	2.22	933.40	742	430.9	723.6	955
10-TR-028 BH10-15	carbonate	0.44	908.39	3155	2235.4	2930.3	978
10-TR-029 BH10-15	carbonate	1.28	891.73	1245	743.8	1158.1	952
10-TR-030 BH10-15	carbonate	0.63	891.73	2749	1512.0	2622.7	945
10-TR-031 BH10-16	carbonate	0.16	900.06	3114	6176.0	2903.4	965
10-TR-032 BH10-16	carbonate	0.16	891.73	3099	6150.4	2876.5	960
10-TR-033 BH10-16	carbonate	0.16	891.73	3076	6105.6	2876.5	953
S449-10	sand/gravel	0.34	655.04	2185	1972.4	2113.0	677
S450-10	sand/gravel	0.16	668.38	2256	4473.6	2156.1	699
S451-10	sand/gravel	0.16	243.35	765	1516.8	785.0	237
S452-10	sand/gravel	0.44	240.85	805	571.4	776.9	249
S453-10	sand/gravel	0.16	268.35	861	1708.8	865.6	266
S454-10	sand/gravel	0.16	5.08	17.1	33.9	16.4	4.99
S455-10	sand/gravel	0.16	34.17	121	240.0	110.2	37.2
S456-10	sand/gravel	0.22	151.68	482	685.7	489.3	149
S457-10	sand/gravel	0.16	120.01	554	1100.8	387.1	171
S458-10	sand/gravel	0.22	93.34	280	396.3	301.1	86.4
S459-10	sand/gravel	0.16	322.52	998	1977.6	1040.4	309
S460-10	sand/gravel	0.16	142.51	441	876.8	459.7	136
S461-10	sand/gravel	0.16	194.18	621	1228.8	626.4	192
S462-10	sand/gravel	0.22	312.52	1001	1417.1	1008.1	310

Note:

CaNP = Carbonate neutralization potential was calculated based on total carbon content (%C)

MPA = Maximum potential acidity was calculated based on total sulphur content (%S)

Table 2 Statistical Summary of Acid Base Accounting Results

	Paste pH	Total Carbon %	Total Sulphur %	Sulphate Sulphur %	Sulphide Sulphur %	Neutral- ization Potential kg CaCO ₃ /t	Acid Potential kg CaCO ₃ /t	CaNP kg CaCO ₃ /t	Maximum Potential Acidity kg CaCO ₃ /t	Ratio NP/AP (NPR)	Ratio NP/MPA calculated ratio	Ratio CaNP/AP
All Quarry Pit Rock (gneiss, schist, carbonate rocks)												
Min	8.1	0.02	<0.005	<0.01	<0.01	6.2	0.31	1.7	0.16	13	5.2	5.4
Max	10	11	0.071	0.04	0.04	978	1.29	933	2.2	3155	6176	2984
Mean	-	2.99	0.019	0.02	0.01	266	0.37	249	0.58	710	458	666
Median	9.7	0.1	<0.014	<0.01	<0.01	10.3	0.31	4.2	0.44	33	24	13.6
Standard Deviation	0.7	4.7	0.016	0.01	0.01	410	0.19	389	0.51	1191	2111	1130
No. of Samples	36	36	36	36	36	36	36	36	36	36	36	36
5th Percentile	8.2	0.026	0.005	0.01	0.01	6.3	0.31	2.2	0.16	19	5.5	5.6
25th Percentile	9.1	0.036	0.005	0.01	0.01	7.7	0.31	3.0	0.16	24	14	9.4
75th Percentile	9.9	5.1	0.028	0.02	0.01	437	0.31	426	0.88	830	1477	819
95th Percentile	10	11	0.046	0.04	0.02	962	0.77	913	1.43	3103	6141	2910
Gneiss												
Min	9.5	0.02	<0.005	<0.01	<0.01	6.2	0.31	1.7	0.16	14	5.2	5.4
Max	10	0.07	0.038	0.04	0.01	11.7	0.44	5.8	1.19	38	56	19
Mean	-	0.04	0.018	0.02	0.01	8.3	0.32	3.3	0.57	26	14	10
Median	9.8	0.04	0.015	<0.01	<0.01	7.9	0.31	3.0	0.47	25	17	9.7
Standard Deviation	0.17	0.01	0.012	0.01	0.00	1.7	0.03	1.1	0.38	5.6	17	3.7
No. of Samples	21	21	21	21	21	21	21	21	21	21	21	21
5th Percentile	9.5	0.02	0.005	0.01	0.01	6.2	0.31	1.9	0.16	20	5.6	5.5
25th Percentile	9.7	0.03	0.006	0.01	0.01	7.1	0.31	2.4	0.19	23	12	7.5
75th Percentile	9.9	0.05	0.028	0.02	0.01	9.5	0.31	3.8	0.88	28	40	12
95th Percentile	10	0.06	0.038	0.04	0.01	12	0.40	5.3	1.19	37	52	17
Schist												
Min	9.7	0.05	0.015	<0.01	<0.01	10	0.31	4.1	0.47	13.3	5.4	5.6
Max	10	0.10	0.060	0.04	0.02	13	0.77	8.0	1.88	40	27	26
Median	9.8	0.05	0.023	0.02	0.01	10	0.41	4.3	0.72	26	14	10
No. of Samples	3	3	3	3	3	3	3.00	3	3.00	3	3	3

**Table 2 Statistical Summary of
Acid Base Accounting Results (Continued)**

	Paste pH	Total Carbon %	Total Sulphur %	Sulphate Sulphur %	Sulphide Sulphur %	Neutral- ization Potential kg CaCO ₃ /t	Acid Potential kg CaCO ₃ /t	CaNP kg CaCO ₃ /t	Maximum Potential Acidity kg CaCO ₃ /t	Ratio NP/AP (NPR)	Ratio NP/MPA calculated ratio	Ratio CaNP/AP
Carbonate Rocks												
Min	8.1	2.8	<0.005	<0.01	<0.01	229	0.31	231	0.16	739	431	724
Max	9.4	11	0.071	0.03	0.04	978	1.29	933	2.2	3155	6176	2984
Mean	-	8.9	0.016	0.01	0.01	780	0.43	740	0.48	1803	1609	1712
Median	8.3	11	<0.005	<0.01	<0.01	954	0.31	892	0.16	3076	6102	2877
Standard Deviation	0.5	3.6	0.021	0.01	0.01	319	0.30	296	0.64	1122	2469	1044
No. of Samples	12	12	12	12	12	12	12	12	12	12	12	12
5th Percentile	8.2	2.9	0.005	0.01	0.01	242	0.31	240	0.16	741	603	735
25th Percentile	8.2	8.8	0.005	0.01	0.01	766	0.31	737	0.16	864	1500	856
75th Percentile	8.2	11	0.005	0.01	0.01	932	0.31	892	0.16	930	1526	912
95th Percentile	9.4	11	0.055	0.02	0.03	971	1.00	929	1.70	3132	6162	2954
Unconsolidated Borrow Material												
Min	8.4	0.1	<0.005	<0.01	<0.01	5.3	0.31	5.1	0.16	17	34	16
Max	9.5	8.0	0.014	0.01	0.01	699	0.31	668	0.44	2256	4474	2156
Mean	-	3.0	0.0065	0.01	0.01	252	0.31	247	0.20	813	1241	795
Median	8.9	2.6	<0.005	<0.01	<0.01	215	0.31	218	0.16	692	1373	702
Standard Deviation	0.3	2.4	0	0	0	207	0	200	0.09	667	1105	646
No. of Samples	14	14	14	14	14	14	14	14	14	14	14	14
5th Percentile	8.4	0.3	0.005	0.01	0.01	26	0.31	24	0.16	85	168	77
25th Percentile	8.8	1.5	0.005	0.01	0.01	140	0.31	126	0.16	451	600	405
75th Percentile	8.9	2.2	0.005	0.01	0.01	185	0.31	180	0.16	598	1024	579
95th Percentile	9.3	7.9	0.012	0.01	0.01	685	0.31	660	0.38	2210	2851	2128

Note:

CaNP = Carbonate neutralization potential was calculated based on total carbon content (%C)

MPA = Maximum potential acidity was calculated based on total sulphur content (%S)

Table 3 Results of Metals Analyses

Sample ID	Drill Log	Al	As	Ba	Be	Bi	Ca	Cd	Co	Cr	Cu
	Lithology	%	µg/g	µg/g	µg/g	µg/g	%	µg/g	µg/g	µg/g	µg/g
Average Crustal Abundance		8.23	1.8	425	3	0.0085	4.15	0.15	25	102	60
10x Average Crustal Abundance		82.3	18	4250	30	0.085	41.5	1.5	250	1020	600
10-TR-001 BH10-04	gneiss	0.33	<0.5	21	0.13	<0.09	0.12	<0.02	1.2	100	18
10-TR-002 BH10-04	gneiss	0.36	<0.5	23	0.15	<0.09	0.13	<0.02	1.1	99	5.0
10-TR-003 BH10-04	gneiss	0.35	<0.5	24	0.13	<0.09	0.14	<0.02	1.1	110	8.5
10-TR-004 BH10-05	gneiss	0.41	<0.5	23	0.17	<0.09	0.11	<0.02	1.5	91	2.9
10-TR-005 BH10-05	gneiss	0.39	<0.5	27	0.15	<0.09	0.07	<0.02	1.3	110	8.1
10-TR-006 BH10-05	gneiss	0.37	<0.5	20	0.18	<0.09	0.06	<0.02	1.3	87	3.2
10-TR-007 BH10-06	gneiss	0.43	<0.5	23	0.20	<0.09	0.10	<0.02	2.0	110	5.2
10-TR-008 BH10-06	gneiss	0.50	<0.5	25	0.29	<0.09	0.10	<0.02	2.3	110	6.6
10-TR-009 BH10-06	gneiss	0.49	<0.5	39	0.19	<0.09	0.14	<0.02	2.5	94	8.4
10-TR-010 BH10-07	gneiss	0.78	<0.5	68	0.25	<0.09	0.29	<0.02	5.2	92	17
10-TR-011 BH10-07	gneiss	1.20	<0.5	110	0.40	0.09	0.36	<0.02	8.0	75	17
10-TR-012 BH10-07	gneiss	1.10	<0.5	57	0.27	0.10	0.36	<0.02	9.9	110	16
10-TR-013 BH10-08	gneiss	0.32	<0.5	23	0.16	<0.09	0.07	<0.02	1.4	110	5.3
10-TR-014 BH10-08	gneiss	0.85	<0.5	64	0.49	<0.09	0.21	<0.02	4.4	79	10
10-TR-015 BH10-08	gneiss	1.00	<0.5	78	0.48	<0.09	0.23	<0.02	5.9	78	12
10-TR-016 BH10-09	gneiss	0.43	<0.5	33	0.14	<0.09	0.09	<0.02	2.4	82	4.3
10-TR-017 BH10-09	gneiss	0.45	<0.5	33	0.17	<0.09	0.14	<0.02	2.6	100	7.2
10-TR-018 BH10-09	gneiss	0.39	<0.5	32	0.14	0.13	0.11	0.05	4.9	81	12
10-TR-019 BH10-12	gneiss	0.59	<0.5	30	0.17	<0.09	0.26	<0.02	5.7	100	28
10-TR-020 BH10-12	gneiss	0.83	<0.5	51	0.18	<0.09	0.23	<0.02	6.1	100	14
10-TR-021 BH10-12	gneiss	0.49	<0.5	24	0.15	<0.09	0.19	<0.02	2.8	100	8.8
10-TR-034 BH10-21	schist	0.74	<0.5	36	0.17	<0.09	0.30	<0.02	2.2	67	6.3
10-TR-035 BH10-12	schist	1.10	<0.5	35	0.27	0.09	0.18	0.03	3.6	69	13
10-TR-036 BH10-12	schist	1.30	1.1	37	0.41	<0.09	0.14	<0.02	3.6	70	8.0
10-TR-022 BH10-13	carbonate rocks	0.05	<0.5	5.5	0.06	<0.09	3.9	<0.02	1.3	99	5.0
10-TR-023 BH10-13	carbonate rocks	0.31	<0.5	16	0.32	<0.09	4.1	0.03	2.1	96	6.1
10-TR-024 BH10-13	carbonate rocks	0.23	<0.5	13	0.22	<0.09	4.8	0.02	1.5	82	2.0
10-TR-025 BH10-14	carbonate rocks	0.08	<0.5	3.0	0.06	<0.09	28.8	<0.02	1.6	2.2	4.0
10-TR-026 BH10-14	carbonate rocks	0.16	0.7	5.3	0.14	<0.09	28.3	0.06	2.1	3.4	3.9
10-TR-027 BH10-14	carbonate rocks	0.08	0.5	2.7	0.06	<0.09	27.0	<0.02	1.6	2.6	4.3
10-TR-028 BH10-15	carbonate rocks	0.08	0.6	3.4	0.07	<0.09	28.2	<0.02	1.7	4.1	2.2
10-TR-029 BH10-15	carbonate rocks	0.12	1.8	4.5	0.08	<0.09	26.7	<0.02	1.9	2.2	4.5
10-TR-030 BH10-15	carbonate rocks	0.13	1.2	4.2	0.08	<0.09	28.4	<0.02	2.0	2.6	5.4
10-TR-031 BH10-16	carbonate rocks	0.08	<0.5	3.2	0.06	<0.09	27.4	<0.02	1.7	2.1	2.0
10-TR-032 BH10-16	carbonate rocks	0.08	1.2	3.1	0.07	<0.09	27.3	<0.02	1.7	2.2	3.9
10-TR-033 BH10-16	carbonate rocks	0.13	1.1	3.9	0.07	<0.09	27.5	<0.02	1.9	2.6	2.4
S449-10	borrow pit material	0.26	1.7	11	0.18	<0.09	13.4	0.03	2.9	39	8.1
S450-10	borrow pit material	0.12	<0.5	6.7	0.09	<0.09	17.2	<0.02	1.9	30	3.5
S451-10	borrow pit material	0.29	0.8	16	0.20	<0.09	4.0	0.03	3.0	89	12
S452-10	borrow pit material	0.39	<0.5	29	0.18	<0.09	5.0	<0.02	3.2	64	8.3
S453-10	borrow pit material	0.20	1.2	16	0.27	<0.09	4.8	0.02	3.4	79	7.5
S454-10	borrow pit material	0.08	<0.5	5.0	0.03	<0.09	0.1	<0.02	0.73	110	2.0
S455-10	borrow pit material	0.24	<0.5	20	0.12	<0.09	0.6	0.02	7.0	170	10
S456-10	borrow pit material	0.35	<0.5	16	0.21	<0.09	3.6	<0.02	2.0	75	6.9
S457-10	borrow pit material	0.39	<0.5	25	0.25	<0.09	2.4	<0.02	2.5	90	4.3
S458-10	borrow pit material	0.38	0.7	25	0.21	<0.09	1.8	<0.02	2.0	82	6.7
S459-10	borrow pit material	0.18	<0.5	9.6	0.14	<0.09	7.4	<0.02	1.7	68	4.2
S460-10	borrow pit material	0.20	<0.5	12	0.13	<0.09	3.6	<0.02	1.5	93	19
S461-10	borrow pit material	0.29	<0.5	15	0.17	<0.09	3.6	<0.02	1.8	74	38
S462-10	borrow pit material	0.25	<0.5	14	0.19	<0.09	6.2	<0.02	1.8	73	8.7

**Table 3 Results of Metals Analyses
(Continued)**

Sample ID	Drill Log	Fe	K	Li	Mg	Mn	Mo	Na	Ni	P	Pb
	Lithology	%	%	µg/g	%	µg/g	µg/g	%	µg/g	µg/g	µg/g
Average Crustal Abundance		5.63	2.085	20	2.33	950	1.2	2.355	84	1050	14
10x Average Crustal Abundance		56.3	20.85	200	23.3	9500	12	23.55	840	10500	140
10-TR-001 BH10-04	gneiss	0.71	0.15	15	0.12	150	0.4	0.05	3.9	25	11
10-TR-002 BH10-04	gneiss	0.66	0.17	18	0.13	180	0.4	0.05	4.1	28	9.3
10-TR-003 BH10-04	gneiss	0.76	0.17	14	0.13	160	0.4	0.05	3.9	47	7.1
10-TR-004 BH10-05	gneiss	0.88	0.17	13	0.20	200	0.4	0.05	3.8	140	5.4
10-TR-005 BH10-05	gneiss	0.82	0.16	11	0.16	190	0.3	0.05	4.3	67	4.1
10-TR-006 BH10-05	gneiss	0.75	0.11	10	0.16	170	0.6	0.05	3.7	61	4.0
10-TR-007 BH10-06	gneiss	0.88	0.24	15	0.22	140	0.3	0.05	3.8	210	4.2
10-TR-008 BH10-06	gneiss	0.93	0.19	15	0.29	160	0.2	0.05	3.7	230	3.8
10-TR-009 BH10-06	gneiss	1.20	0.33	19	0.24	160	0.2	0.05	4.3	270	6.5
10-TR-010 BH10-07	gneiss	1.90	0.56	23	0.50	280	0.4	0.06	5.6	630	9.3
10-TR-011 BH10-07	gneiss	2.60	0.71	36	0.93	300	0.5	0.05	7.1	1000	2.8
10-TR-012 BH10-07	gneiss	1.86	0.72	34	1.10	290	2.1	0.06	25	440	3.2
10-TR-013 BH10-08	gneiss	0.83	0.17	11	0.16	150	0.3	0.05	3.4	92	5.3
10-TR-014 BH10-08	gneiss	1.40	0.49	26	0.59	240	0.4	0.04	4.9	490	2.5
10-TR-015 BH10-08	gneiss	1.70	0.70	29	0.76	320	0.2	0.04	5.3	670	2.0
10-TR-016 BH10-09	gneiss	1.00	0.28	17	0.23	150	2.5	0.05	3.2	230	6.6
10-TR-017 BH10-09	gneiss	1.20	0.30	20	0.25	180	1.1	0.05	4.2	260	5.8
10-TR-018 BH10-09	gneiss	0.95	0.28	13	0.20	140	1.5	0.05	3.4	220	29
10-TR-019 BH10-12	gneiss	1.10	0.35	10	0.46	180	1.0	0.06	20	160	5.0
10-TR-020 BH10-12	gneiss	1.90	0.54	20	0.64	280	6.8	0.05	15	220	6.8
10-TR-021 BH10-12	gneiss	1.40	0.27	9	0.30	140	3.4	0.05	5.0	250	12
10-TR-034 BH10-21	schist	1.10	0.54	8	0.41	250	0.4	0.03	2.9	120	3.2
10-TR-035 BH10-12	schist	1.60	0.60	12	0.74	280	0.2	0.03	3.1	260	3.3
10-TR-036 BH10-12	schist	1.80	0.50	17	1.00	280	0.4	0.03	3.8	120	1.7
10-TR-022 BH10-13	carbonate rocks	0.40	0.04	<2	2.20	270	0.5	0.01	5.0	370	0.83
10-TR-023 BH10-13	carbonate rocks	0.73	0.17	18	2.60	280	0.4	0.01	8.9	540	0.98
10-TR-024 BH10-13	carbonate rocks	0.58	0.14	13	2.80	340	<0.1	0.02	7.0	1090	0.89
10-TR-025 BH10-14	carbonate rocks	0.16	0.03	<2	0.65	70	<0.1	0.02	14	21	1.0
10-TR-026 BH10-14	carbonate rocks	0.28	0.04	<2	0.41	120	<0.1	0.01	15	43	1.6
10-TR-027 BH10-14	carbonate rocks	0.17	0.03	<2	1.30	71	<0.1	0.01	14	42	1.1
10-TR-028 BH10-15	carbonate rocks	0.19	0.03	<2	0.95	77	<0.1	0.02	14	78	1.3
10-TR-029 BH10-15	carbonate rocks	0.25	0.04	2	0.57	170	<0.1	0.02	15	85	2.0
10-TR-030 BH10-15	carbonate rocks	0.25	0.04	3	0.66	120	<0.1	0.02	15	86	1.6
10-TR-031 BH10-16	carbonate rocks	0.17	0.03	<2	0.98	66	<0.1	0.02	14	57	1.2
10-TR-032 BH10-16	carbonate rocks	0.18	0.03	<2	0.98	62	<0.1	0.02	14	70	1.4
10-TR-033 BH10-16	carbonate rocks	0.26	0.05	3	0.86	89	<0.1	0.02	15	92	1.8
S449-10	borrow pit material	0.59	0.18	24	4.90	140	0.5	0.02	11	130	4.3
S450-10	borrow pit material	0.34	0.07	<2	2.90	100	0.2	0.02	10	120	1.9
S451-10	borrow pit material	0.74	0.12	5	2.50	130	0.3	0.02	10	230	7.0
S452-10	borrow pit material	0.99	0.24	10	2.10	140	0.2	0.03	6.9	200	3.8
S453-10	borrow pit material	0.89	0.09	4	2.80	270	0.1	0.02	8.6	830	2.1
S454-10	borrow pit material	0.30	0.03	<2	0.03	25	0.4	0.01	3.4	16	0.75
S455-10	borrow pit material	1.10	0.09	2	1.20	120	0.3	0.02	110	130	2.7
S456-10	borrow pit material	0.79	0.13	9	1.10	140	0.5	0.03	5.2	140	3.5
S457-10	borrow pit material	0.81	0.15	11	1.20	130	0.2	0.03	5.7	140	3.7
S458-10	borrow pit material	0.87	0.16	9	1.00	130	0.4	0.03	5.1	240	4.5
S459-10	borrow pit material	0.50	0.07	5	2.00	94	0.3	0.02	6.3	120	2.2
S460-10	borrow pit material	0.53	0.09	3	0.77	74	0.6	0.02	5.5	140	2.0
S461-10	borrow pit material	0.70	0.12	8	1.90	130	0.3	0.03	4.6	170	3.8
S462-10	borrow pit material	0.63	0.11	7	2.70	100	0.3	0.02	6.6	110	3.3

**Table 3 Results of Metals Analyses
(Continued)**

Sample ID	Drill Log	Sb	Se	Si	Sn	Sr	Ti	Tl	U	V	Y	Zn
	Lithology	µg/g	µg/g	µg/g	µg/g	µg/g	%	µg/g	µg/g	µg/g	µg/g	µg/g
Average Crustal Abundance		0.2	0.05	281500	2.3	370	0.565	0.85	2.7	120	33	70
10x Average Crustal Abundance		2	0.5	2815000	23	3700	5.65	8.5	27	1200	330	700
10-TR-001 BH10-04	gneiss	<0.8	0.8	530	<0.5	6.6	0.02	0.07	4.8	3	2.0	20
10-TR-002 BH10-04	gneiss	<0.8	<0.7	450	<0.5	6.6	0.02	0.09	5.2	3	2.2	20
10-TR-003 BH10-04	gneiss	<0.8	<0.7	480	<0.5	6.2	0.02	0.08	4.4	3	2.4	21
10-TR-004 BH10-05	gneiss	<0.8	<0.7	440	<0.5	5.6	0.02	0.10	5.2	5	4.1	21
10-TR-005 BH10-05	gneiss	<0.8	<0.7	460	<0.5	6.3	0.02	0.07	2.8	3	2.7	22
10-TR-006 BH10-05	gneiss	<0.8	<0.7	440	<0.5	5.6	0.01	0.06	13	3	3.9	18
10-TR-007 BH10-06	gneiss	<0.8	<0.7	490	<0.5	6.5	0.04	0.12	2.1	9	4.1	24
10-TR-008 BH10-06	gneiss	<0.8	<0.7	560	<0.5	6.2	0.03	0.10	2.7	10	4.9	27
10-TR-009 BH10-06	gneiss	<0.8	<0.7	530	0.6	7.6	0.06	0.23	6.0	14	6.7	31
10-TR-010 BH10-07	gneiss	<0.8	<0.7	700	1.2	13	0.17	0.38	4.5	32	16	46
10-TR-011 BH10-07	gneiss	<0.8	<0.7	650	0.8	14	0.19	0.44	4.0	48	14	49
10-TR-012 BH10-07	gneiss	<0.8	<0.7	780	<0.5	7.3	0.14	0.48	3.5	43	9.8	36
10-TR-013 BH10-08	gneiss	<0.8	<0.7	500	<0.5	6.6	0.03	0.07	2.5	5	3.3	19
10-TR-014 BH10-08	gneiss	<0.8	<0.7	690	<0.5	8.5	0.09	0.31	4.7	22	7.1	34
10-TR-015 BH10-08	gneiss	<0.8	<0.7	610	<0.5	8.2	0.13	0.46	3.1	28	8.2	50
10-TR-016 BH10-09	gneiss	<0.8	<0.7	470	<0.5	6.6	0.06	0.17	2.6	13	3.7	23
10-TR-017 BH10-09	gneiss	<0.8	<0.7	460	0.6	7.1	0.07	0.19	4.2	15	4.7	31
10-TR-018 BH10-09	gneiss	<0.8	<0.7	520	<0.5	8.1	0.06	0.22	9.6	12	5.5	29
10-TR-019 BH10-12	gneiss	<0.8	<0.7	470	<0.5	6.8	0.08	0.19	2.9	19	3.5	24
10-TR-020 BH10-12	gneiss	<0.8	<0.7	600	1.2	9.7	0.12	0.31	4.0	30	3.4	38
10-TR-021 BH10-12	gneiss	<0.8	<0.7	600	0.8	17	0.07	0.13	4.9	12	8.2	31
10-TR-034 BH10-21	schist	<0.8	1.5	540	<0.5	5.8	0.06	0.21	2.2	6	3.9	23
10-TR-035 BH10-12	schist	<0.8	2.2	590	<0.5	4.8	0.06	0.21	2.3	6	7.4	26
10-TR-036 BH10-12	schist	<0.8	0.9	630	<0.5	3.4	0.03	0.15	2.2	7	5.2	28
10-TR-022 BH10-13	carbonate rocks	<0.8	<0.7	270	<0.5	14	0.00	0.02	0.31	7	2.3	2.2
10-TR-023 BH10-13	carbonate rocks	<0.8	<0.7	590	<0.5	24	0.02	0.04	0.40	11	5.0	9.9
10-TR-024 BH10-13	carbonate rocks	<0.8	1.0	450	<0.5	22	0.01	0.02	0.41	7	9.1	5.8
10-TR-025 BH10-14	carbonate rocks	<0.8	<0.7	390	<0.5	290	0.00	<0.02	0.30	4	1.5	4.0
10-TR-026 BH10-14	carbonate rocks	<0.8	<0.7	420	<0.5	300	0.00	<0.02	0.34	5	4.0	6.4
10-TR-027 BH10-14	carbonate rocks	<0.8	0.9	350	<0.5	280	0.00	<0.02	0.34	4	1.6	4.5
10-TR-028 BH10-15	carbonate rocks	<0.8	0.9	530	<0.5	270	0.00	<0.02	0.34	4	2.2	3.3
10-TR-029 BH10-15	carbonate rocks	<0.8	1.0	340	<0.5	240	0.00	<0.02	0.39	5	2.8	6.1
10-TR-030 BH10-15	carbonate rocks	<0.8	1.0	430	<0.5	290	0.00	<0.02	0.33	5	2.9	6.2
10-TR-031 BH10-16	carbonate rocks	<0.8	1.5	440	<0.5	270	0.00	<0.02	0.28	4	1.8	3.0
10-TR-032 BH10-16	carbonate rocks	<0.8	1.8	400	<0.5	260	0.00	<0.02	0.32	4	2.2	5.0
10-TR-033 BH10-16	carbonate rocks	<0.8	1.0	420	<0.5	270	0.00	<0.02	0.34	5	2.7	3.9
S449-10	borrow pit material	<0.8	2.1	520	<0.5	85	0.01	0.05	0.37	12	3.5	9.6
S450-10	borrow pit material	<0.8	0.9	350	<0.5	130	0.01	0.03	0.36	7	2.1	4.4
S451-10	borrow pit material	<0.8	1.2	470	<0.5	18	0.03	0.07	0.47	13	4.4	14
S452-10	borrow pit material	<0.8	1.1	530	0.7	31	0.05	0.11	1.2	15	3.2	18
S453-10	borrow pit material	<0.8	1.7	430	<0.5	21	0.01	<0.02	0.57	10	3.4	7.7
S454-10	borrow pit material	<0.8	1.9	310	<0.5	2.2	0.00	<0.02	0.24	1	0.60	1.7
S455-10	borrow pit material	<0.8	2.0	610	<0.5	5.3	0.02	0.03	0.71	8	2.2	13
S456-10	borrow pit material	<0.8	1.8	370	0.6	27	0.02	0.06	1.7	9	3.8	17
S457-10	borrow pit material	<0.8	1.4	440	<0.5	18	0.02	0.07	2.3	10	4.3	14
S458-10	borrow pit material	<0.8	2.0	520	0.6	13	0.03	0.08	2.6	9	4.8	18
S459-10	borrow pit material	<0.8	2.0	380	<0.5	47	0.01	<0.02	0.68	7	2.4	6.9
S460-10	borrow pit material	<0.8	1.7	370	<0.5	27	0.01	<0.02	0.62	6	2.0	12
S461-10	borrow pit material	<0.8	1.9	400	0.8	21	0.02	0.04	1.8	8	3.4	20
S462-10	borrow pit material	<0.8	1.8	400	<0.5	36	0.02	0.03	1.3	8	2.8	13

*Price (1997)

Table 4 Statistical Summary of Metals Analyses

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**Table 4 Statistical Summary
of Metals Analyses (Continued)**

	Al	As	Ba	Be	Bi	Ca	Cd	Co	Cr	Cu	Fe	K	Li	Mg	Mn
	%	µg/g	µg/g	µg/g	µg/g	%	µg/g	µg/g	µg/g	µg/g	%	%	µg/g	%	µg/g
Average Concentration (Continental Crust)*	8.2	1.8	425	3	0.0085	4.15	0.15	25	102	60	5.63	2.09	20	2.33	950
Ten Times Average Concentration (Continental Crust)*	82	18	4250	30	0.085	42	1.5	250	1020	600	56	21	200	23.3	9500
Carbonate Rocks															
Min	0.05	0.5	2.7	0.06	0.09	3.90	0.02	1.3	2.1	2.0	0.16	0.03	2.0	0.41	62
Max	0.31	1.8	16	0.32	0.09	29	0.06	2.1	99	6.1	0.73	0.17	18	2.80	340
Mean	0.13	0.8	5.7	0.11	0.09	22	0.02	1.8	25	3.8	0.30	0.06	4.4	1.25	145
Median	0.10	0.6	4.1	0.07	0.09	27	0.02	1.7	2.6	4.0	0.25	0.04	2.0	0.97	105
Standard Deviation	0.08	0.4	4.3	0.08	0	11	0.01	0.2	41	1.4	0.18	0.05	5.3	0.82	98
No. of Samples	12.0	12	12	12	12	12	12	12	12	12	12	12	12	12	12
5th Percentile	0.07	0.5	2.9	0.06	0.09	4.01	0.02	1.4	2.2	2.0	0.17	0.03	2.0	0.50	64
25th Percentile	0.08	0.5	3.2	0.06	0.09	21	0.02	1.6	2.2	2.4	0.18	0.03	2.0	0.66	71
75th Percentile	0.14	1.1	5.4	0.10	0.09	28	0.02	1.9	24	4.6	0.31	0.04	3.0	1.53	195
95th Percentile	0.27	1.5	14	0.27	0.09	29	0.04	2.1	97	5.7	0.65	0.15	15	2.69	307
Unconsolidated Borrow Material															
Min	0.08	0.5	5.0	0.03	0.09	0.05	0.02	0.7	30	2.0	0.30	0.03	2.0	0.03	25
Max	0.39	1.7	29	0.27	0.09	17	0.03	7.0	170	38.0	1.10	0.24	24	4.90	270
Mean	0.26	0.7	16	0.17	0.09	5.3	0.02	2.5	81	9.9	0.70	0.12	7.2	1.94	123
Median	0.26	0.5	16	0.18	0.09	3.8	0.02	2.0	77	7.8	0.72	0.12	6.0	1.95	130
Standard Deviation	0.10	0.4	7.0	0.06	0	4.8	0.004	1.5	33	9.1	0.23	0.05	5.8	1.21	53
No. of Samples	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
5th Percentile	0.11	0.5	6.1	0.07	0.09	0.41	0.02	1.2	36	3.0	0.33	0.05	2.0	0.51	57
25th Percentile	0.20	0.5	11	0.13	0.09	2.7	0.02	1.8	69	4.9	0.55	0.09	3.3	1.13	100
75th Percentile	0.34	0.7	19	0.21	0.09	5.9	0.02	3.0	90	9.7	0.86	0.15	9.0	2.65	138
95th Percentile	0.39	1.4	26	0.26	0.09	15	0.03	4.7	131	26	1.03	0.20	16	3.60	186

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**Table 4 Statistical Summary
of Metals Analyses (Continued)**

	Mo	Na	Ni	P	Pb	Sb	Se	Si	Sn	Sr	Ti	Tl	U	V	Y	Zn
	µg/g	%	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	%	µg/g	µg/g	µg/g	µg/g	µg/g
Average Concentration (Continental Crust)*	1.2	2.4	84	1050	14	0.2	0.05	281500	2.3	370	0.57	0.85	2.7	120	33	70
Ten Times Average Concentration (Continental Crust)*	12	24	840	10500	140	2	0.5	2815000	23	3700	5.7	8.5	27	1200	330	700
Carbonate Rocks																
Min	0.10	0.012	5	21	0.8	0.8	0.7	270	0.5	14	0.001	0.02	0.3	4.0	1.5	2.2
Max	0.50	0.018	15	1090	2.0	0.8	1.8	590	0.5	300	0.02	0.04	0.4	11.0	9.1	9.9
Mean	0.16	0.015	13	215	1.3	0.8	1.0	419	0.5	211	0.004	0.02	0.3	5.4	3.2	5.0
Median	0.10	0.015	14	82	1.3	0.8	1.0	420	0.5	270	0.001	0.02	0.3	5.0	2.5	4.8
Standard Deviation	0.14	0.002	3.5	317	0.4	0	0.3	84	0	116	0.01	0.01	0.0	2.1	2.1	2.1
No. of Samples	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
5th Percentile	0.10	0.013	6.1	33	0.9	0.8	0.7	309	0.5	18	0.001	0.02	0.3	4.0	1.6	2.6
25th Percentile	0.10	0.014	13	54	1.0	0.8	0.7	380	0.5	186	0.001	0.02	0.3	4.0	2.1	3.8
75th Percentile	0.10	0.016	15	162	1.6	0.8	1.0	443	0.5	283	0.002	0.02	0.4	5.5	3.2	6.1
95th Percentile	0.45	0.017	15	788	1.9	0.8	1.6	557	0.5	295	0.02	0.03	0.4	8.8	6.8	8.0
Unconsolidated Borrow Material																
Min	0.10	0.011	3.4	16	0.8	0.8	0.9	310	0.5	2.2	0.004	0.02	0.2	1.0	0.6	1.7
Max	0.60	0.031	110	830	7.0	0.8	2.1	610	0.8	130	0.05	0.11	2.6	15.0	4.8	20.0
Mean	0.33	0.021	14	194	3.3	0.8	1.7	436	0.6	34	0.02	0.05	1.1	8.8	3.1	12.1
Median	0.30	0.020	6.5	140	3.4	0.8	1.8	415	0.5	24	0.02	0.04	0.7	8.5	3.3	13.0
Standard Deviation	0.14	0.006	28	191	1.5	0.0	0.4	84	0.1	34	0.01	0.03	0.8	3.4	1.1	5.4
No. of Samples	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
5th Percentile	0.17	0.014	4.2	77	1.5	0.8	1.0	336	0.5	4.2	0.01	0.02	0.3	4.3	1.5	3.5
25th Percentile	0.23	0.017	5.3	123	2.1	0.8	1.5	373	0.5	18	0.01	0.02	0.5	7.3	2.3	8.2
75th Percentile	0.40	0.026	9.7	193	3.8	0.8	2.0	508	0.6	35	0.02	0.07	1.6	10.0	3.7	16.3
95th Percentile	0.54	0.030	46	447	5.4	0.8	2.0	558	0.7	101	0.03	0.09	2.4	13.7	4.5	18.7

*Price (1997)

**Table 5 Results of
Shake Flask Extraction Test**

	Units	MMER	CWQG (PAL)	CDWQ	10-TR-001 BH10-04	10-TR-005 BH10-05	10-TR-009 BH10-06	10-TR-014 BH10-08	10-TR-017 BH10-09	10-TR-019 BH10-12	10-TR-035 BH10-12
					Gneiss	Gneiss	Gneiss	Gneiss	Gneiss	Gneiss	Schist
Sample Weight	g				250	250	250	250	250	250	250
Volume mL	D.I. H ₂ O				750	750	750	750	750	750	750
Initial pH	units				9.51	9.41	9.63	9.63	9.59	9.58	9.74
Final pH	units	6.0 - 9.5	6.5 - 9.0	6.5 - 8.5	9.45	9.64	9.73	9.67	9.69	9.73	9.67
Mercury (Hg)	mg/L	-	0.026	0.001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Aluminum (Al)	mg/L	-	0.005- 0.1 ^a	-	0.97	0.84	0.98	0.58	0.91	0.75	1.42
Arsenic (As)	mg/L	0.5	0.005	0.005	0.0013	0.0004	0.0009	0.0005	0.0005	<0.0002	0.0012
Barium (Ba)	mg/L	-	-	1	0.00450	0.00444	0.00438	0.00420	0.00340	0.00309	0.00449
Beryllium (Be)	mg/L	-	-	-	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Bismuth (Bi)	mg/L	-	-	-	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Calcium (Ca)	mg/L	-	-	-	2.95	3.01	2.86	2.96	2.59	2.25	1.29
Cadmium (Cd)	mg/L	-	0.000017	0.005	< 0.000003	< 0.000003	< 0.000003	< 0.000003	< 0.000003	< 0.000003	< 0.000003
Cobalt (Co)	mg/L	-	-	-	0.000028	0.000030	0.000049	0.000060	0.000053	0.000122	0.000062
Chromium (Cr)	mg/L	-	0.001 0.002-	0.051	<0.0005	0.0009	0.0010	<0.0005	0.0011	0.0013	0.0010
Copper (Cu)	mg/L	0.3	0.004 ^b	≤1.0 ^c	0.0009	<0.0005	<0.0005	<0.0005	<0.0005	0.0005	<0.0005
Iron (Fe)	mg/L	-	0.3	<0.3 ^c	0.069	0.094	0.115	0.127	0.116	0.186	0.233
Potassium (K)	mg/L	-	-	-	6.75	6.51	8.50	8.88	7.66	8.41	13.8
Lithium (Li)	mg/L	-	-	-	0.006	0.006	0.011	0.016	0.012	0.010	0.003
Magnesium (Mg)	mg/L	-	-	-	0.245	0.477	0.370	0.788	0.345	0.422	0.321
Manganese (Mn)	mg/L	-	-	≤0.05	0.00225	0.00268	0.00279	0.00265	0.00308	0.00364	0.00330
Molybdenum (Mo)	mg/L	-	0.073	-	0.00125	0.00096	0.00039	0.00084	0.00073	0.00432	0.00118
Sodium (Na)	mg/L	-	-	-	5.94	5.21	5.39	6.26	5.53	3.75	11.7
Nickel (Ni)	mg/L	0.5	0.025- 0.15 ^b	-	0.0001	< 0.0001	0.0002	0.0002	0.0002	0.0006	0.0003
Lead (Pb)	mg/L	0.2	0.001- 0.007 ^b	0.01	0.00083	0.00029	0.00043	0.00013	0.00053	0.00046	0.00032
Antimony (Sb)	mg/L	-	-	0.006	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	0.0003
Selenium (Se)	mg/L	-	0.001	-	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Tin (Sn)	mg/L	-	-	-	0.00003	0.00004	0.00003	0.00003	0.00004	0.00002	< 0.00001
Strontium (Sr)	mg/L	-	-	-	0.0105	0.0109	0.0123	0.0190	0.0109	0.0077	0.0037
Titanium (Ti)	mg/L	-	-	-	0.0037	0.0047	0.0118	0.0138	0.0134	0.0185	0.0126
Thallium (Tl)	mg/L	-	-	-	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Uranium (U)	mg/L	-	-	-	0.00940	0.00860	0.00817	0.00277	0.00528	0.00242	0.00143
Vanadium (V)	mg/L	-	-	-	0.00200	0.00268	0.00547	0.0111	0.00557	0.0129	0.00299
Zinc (Zn)	mg/L	0.5	0.03	≤5.0	< 0.001	< 0.001	< 0.001	0.002	< 0.001	0.001	< 0.001

**Table 5 Results of
Shake Flask Extraction Test (Continued)**

	Units	MMER	CWQG (PAL)	CDWQ	10-TR-024	10-TR-025	10-TR-029	10-TR-033	S449-10	S454-10	S458-10	S461-10
					BH10-13 Sand- stone	BH10-14 Sandy Carbonate	BH10-15 Carb- onate	BH10-16 Carb- onate	Sand/ Gravel	Sand/ Gravel	Sand/ Gravel	Sand/ Gravel
Sample Weight	g				250	250	250	250	250	250	250	250
Volume mL	D.I. H ₂ O				750	750	750	750	750	750	750	750
Initial pH	units				9.66	9.52	9.60	9.64	9.46	7.44	9.53	9.31
Final pH	units	6.0 - 9.5	6.5 - 9.0	6.5 - 8.5	9.38	9.11	8.95	9.03	8.94	7.90	9.30	9.27
Mercury (Hg)	mg/L	-	0.026	0.001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Aluminum (Al)	mg/L	-	0.005- 0.1 ^a	-	0.04	0.23	0.16	0.10	0.04	0.50	0.21	0.25
Arsenic (As)	mg/L	0.5	0.005	0.005	0.0013	0.0003	0.0004	< 0.0002	0.0008	0.0003	0.0014	0.0007
Barium (Ba)	mg/L	-	-	1	0.00385	0.00167	0.00170	0.00144	0.00376	0.00406	0.00324	0.00388
Beryllium (Be)	mg/L	-	-	-	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Bismuth (Bi)	mg/L	-	-	-	< 0.00001	< 0.00001	0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Calcium (Ca)	mg/L	-	-	-	8.32	10.8	12.2	11.4	11.3	4.61	9.28	13.0
Cadmium (Cd)	mg/L	-	0.000017	0.005	< 0.000003	< 0.000003	< 0.000003	< 0.000003	< 0.000003	< 0.000003	< 0.000003	< 0.000003
Cobalt (Co)	mg/L	-	-	-	0.000039	0.000051	0.000059	0.000054	0.000080	0.000137	0.000045	0.000099
Chromium (Cr)	mg/L	-	0.001	0.051	0.0013	0.0007	0.0006	0.0006	0.0027	0.0014	0.0006	0.0008
Copper (Cu)	mg/L	0.3	0.004 ^b	≤ 1.0 ^c	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.0011	0.0023	0.0015	0.0484
Iron (Fe)	mg/L	-	0.3	< 0.3 ^c	< 0.002	< 0.002	< 0.002	< 0.002	0.010	0.169	0.004	0.059
Potassium (K)	mg/L	-	-	-	8.56	2.03	2.27	2.51	6.90	0.818	7.14	4.94
Lithium (Li)	mg/L	-	-	-	0.009	0.004	0.005	0.006	0.028	< 0.001	0.004	0.010
Magnesium (Mg)	mg/L	-	-	-	7.40	2.55	2.74	3.71	11.3	1.73	3.42	3.83
Manganese (Mn)	mg/L	-	-	≤ 0.05	0.00037	0.00030	0.00065	0.00023	0.00064	0.00898	0.00024	0.00165
Molybdenum (Mo)	mg/L	-	0.073	-	0.00073	0.00048	0.00207	0.00069	0.00390	0.00053	0.00177	0.00226
Sodium (Na)	mg/L	-	-	-	0.94	1.38	1.82	1.65	1.85	0.15	4.06	2.35
Nickel (Ni)	mg/L	0.5	0.025- 0.15 ^b	-	0.0001	< 0.0001	0.0002	0.0001	0.0004	0.0006	0.0002	0.0004
Lead (Pb)	mg/L	0.2	0.001- 0.007 ^b	0.01	< 0.00002	0.00002	< 0.00002	< 0.00002	< 0.00002	0.00079	< 0.00002	0.00015
Antimony (Sb)	mg/L	-	-	0.006	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	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	-	-	-	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	0.00001	< 0.00001	0.00006
Strontium (Sr)	mg/L	-	-	-	0.0224	0.139	0.121	0.120	0.0422	0.0073	0.0217	0.0202
Titanium (Ti)	mg/L	-	-	-	0.0003	< 0.0001	0.0003	0.0001	0.0008	0.0111	0.0001	0.0037
Thallium (Tl)	mg/L	-	-	-	< 0.00002	< 0.00002	0.00006	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Uranium (U)	mg/L	-	-	-	0.000234	0.000071	0.000095	0.000107	0.000486	0.000243	0.000974	0.00225
Vanadium (V)	mg/L	-	-	-	0.00494	0.00084	0.00068	0.00042	0.00112	0.00109	0.00456	0.00417
Zinc (Zn)	mg/L	0.5	0.03	≤ 5.0	< 0.001	< 0.001	< 0.001	0.001	< 0.001	0.001	< 0.001	0.001

Note:

MMER = Metals, Mining Effluent (SOR 2002 - 222)

Bold values indicate parameters above the MMER value.

** Lab data reported for total chromium.

CWQG (PAL) and CDWQ provided for reference only (see text)

CWQG (PAL) = Canadian Water Quality Guidelines Protection of Aquatic Life, 2007

CDWQ = Health Canada - Canadian Drinking Water Guideline

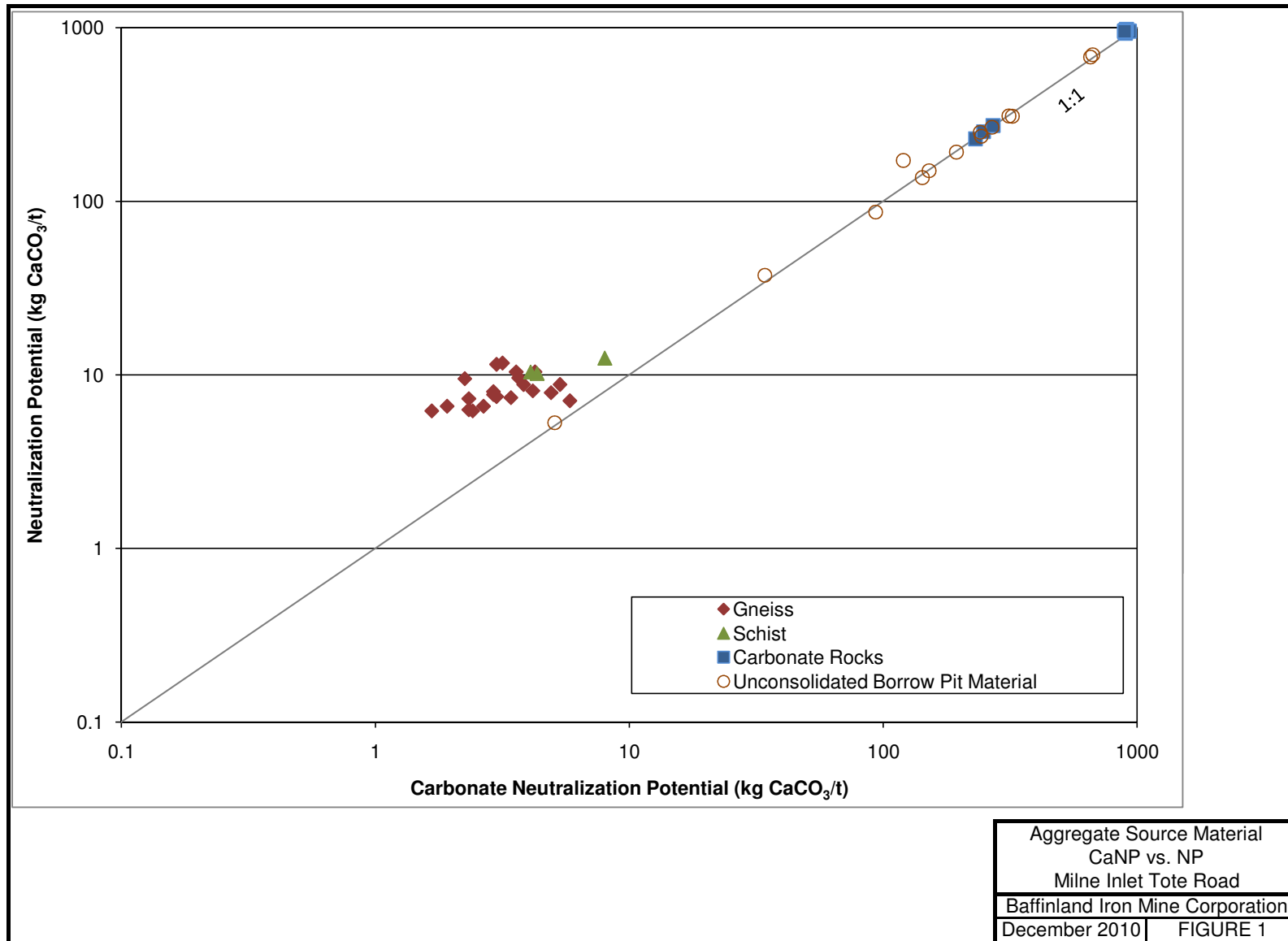
a) varies with pH

b) varies with hardness

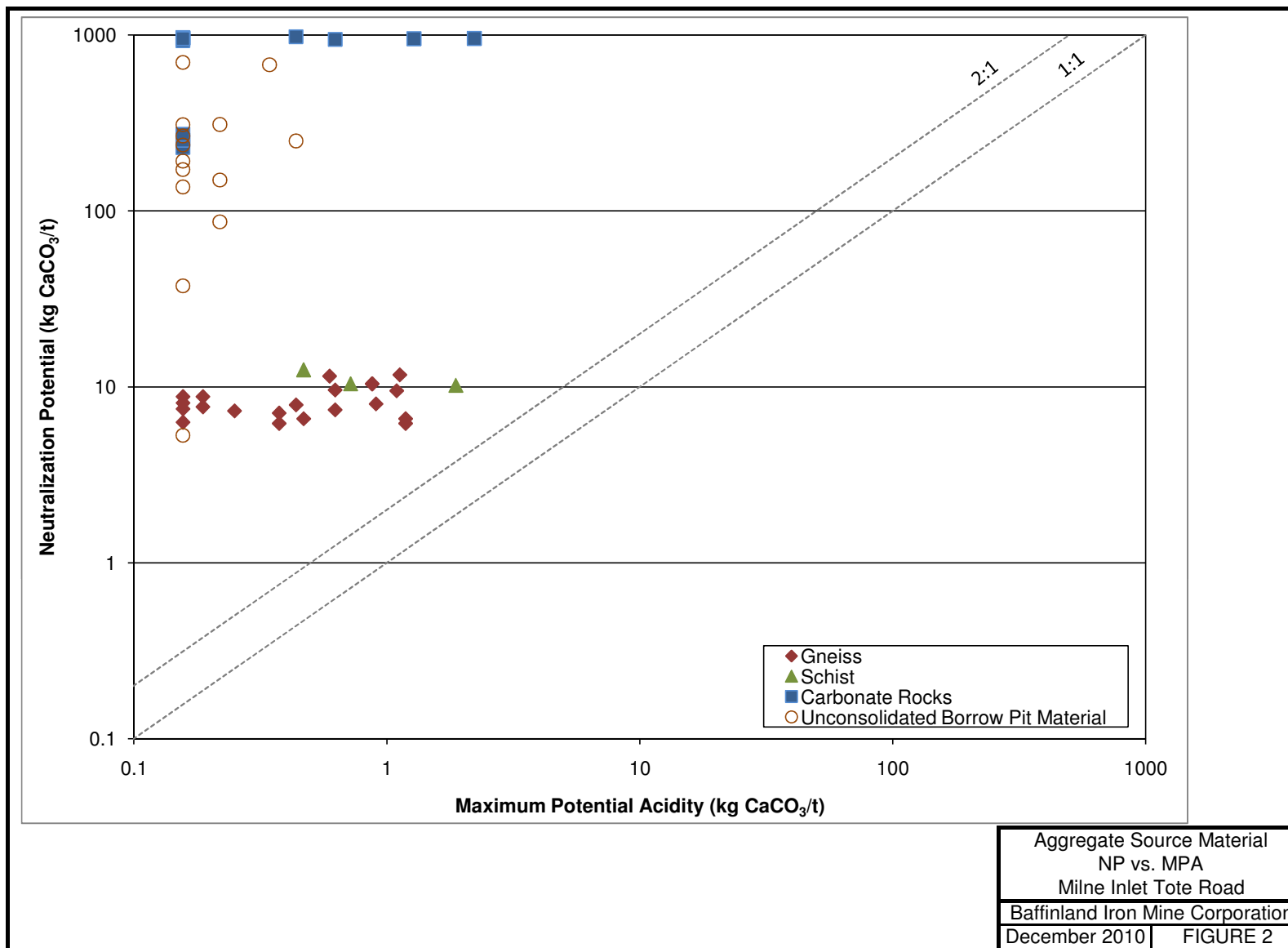
c) Aesthetic objective

Mineral/Compound		Ideal Formula	10-TR-024 BH10-13	10-TR-025 BH10-14	10-TR-029 BH10-15	10-TR-033 BH10-16	S449-10	S454-10	S458-10	S461-10
			carbonate cemented sandstone	carbonate	carbonate	carbonate	borrow material	borrow material	borrow material	borrow material
			(wt %)	(wt %)	(wt %)	(wt %)	(wt %)	(wt %)	(wt %)	(wt %)
Calcite	Carbonates	CaCO ₃	--	99.3	98.9	98.3	22.6	0.2	0.1	2.2
Rhodochrosite		MnCO ₃	--	--	--	--	--	--	--	0.6
Dolomite		CaMg(CO ₃) ₂	25.9	0.3	0.3	0.6	46.4	--	6.2	11.5
Ankerite		Ca(Mg, Fe)(CO ₃) ₂	--	0.1	0.1	0.3	11.7	--	3.3	3.0
Quartz		SiO ₂	56.3	0.3	0.7	0.8	9.7	98.8	33.0	28.5
Albite	Feldspars	NaAlSi ₃ O ₈	1.2	--	--	--	1.1	0.7	22.7	25.2
Anorthite		CaAl ₂ Si ₂ O ₈	--	--	--	--	--	--	5.1	3.5
Orthoclase		KAlSi ₃ O ₈	1.4	--	--	--	1.3	--	3.9	4.1
Microcline		KAlSi ₃ O ₈	15.2	--	--	--	4.6	--	18.3	12.8
Diopside (clinopyroxene)		CaMgSi ₂ O ₆	--	--	--	--	--	--	2.8	3.1
Actinolite (amphibole)		Ca ₂ (Mg,Fe) ₅ Si ₈ O ₂₂ (OH) ₂	--	--	--	--	--	--	--	--
Phlogopite	Phyllo-silicates	KMg ₃ (AlSi ₃ O ₁₀)(OH) ₂	--	--	--	--	--	--	3.7	3.4
Biotite		K(Mg,Fe) ₃ (AlSi ₃ O ₁₀)(OH) ₂	--	--	--	--	--	--	--	--
Clinochlore (chlorite)		(Mg, Fe) ₅ (Si ₃ Al) O ₁₀ (OH) ₈	--	--	--	--	2.6	0.3	0.5	1.6
Magnetite		Fe ₃ O ₄	--	--	--	--	--	--	0.4	0.5
TOTAL			100	100	100	100	100	100	100	100

FIGURES



Job No. TC101510



Job No. TC101510