Pebble Project

Metal Leaching/Acid Rock Drainage Characterization

DRAFT Sampling and Analysis Plan

Prepared for

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Prepared by

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June 2005

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Table of Contents

List of Tables

List of Figures

List of Appendices

Acronyms

AP	acid potential
ABA	acid-base accounting
ASTM	American Society for Testing and Materials
CEMI	Canadian Environmental and Metallurgical Inc.
cm	centimetres
CUEQ%	copper equivalent grade
kg	kilogram(s)
L	liter(s)
mg	milligram(s)
ML/ARD	metal leaching/acid rock drainage
μg	microgram(s)
μmhos	micromhos
NDM	Northern Dynasty Mines Inc.
NNP	net neutralization potential
NP	neutralization potential
SRK	SRK Consulting Inc.
SAP	sampling and analysis plan

1 Introduction

Geological materials exposed, excavated, and processed during mining of the Pebble Project will have varying potentials for leaching of contained metals, as well as for production of acidic drainage. SRK Consulting (SRK) has been retained by Northern Dynasty Mines Inc. (NDM) to develop and implement a laboratory testing program for metal leaching and acid rock drainage (ML/ARD) to provide input into prediction of water chemistry for the various mine components.

ML/ARD test programs are by nature iterative. Iterations occur as a result of results obtained and changes in the overall project concept. This document describes sample selection and test methods as completed to March 2005.

2 Program Design

2.1 Geological Background

The calc-alkalic porphyry copper-gold-molybdenum deposit occurs in deformed turbiditic sedimentary rocks (siltsone, argillite, greywacke) intruded by diorite and porphyritic granodiorite to tonalite. The porphyry phases occur as dykes, sills and irregular bodies. A large breccia mass is also present. Porphyry mineralization occurs as pyrite with lesser chalcopyrite, bornite, and molybdenite in fractures near the core of the deposit. Pyrite content increases in the periphery. Alteration is dominantly potassic dominantly expressed as biotite with lesser K-feldspar. The host rocks and mineralization are pre-Tertiary in age.

To the east, the pre-Tertiary rocks are overlain by Tertiary cover consisting of sedimentary (conglomerate with lesser siltstone and sandstone) and volcano-sedimentary (andesite, dacite, and latite) rocks. While these rocks were deposited after the porphyry mineralizing event, drill-core from the Tertiary cover rocks indicates that they contain low but locally variable concentrations of pyrite. Calcite is common in the Tertiary cover rocks.

Oxidation of the exposed mineralized pre-Tertiary has occurred, resulting in a thin gossan zone, minor supergene enrichment, and ferricrete zones on surface.

Additional geological background can be found in Bouley et al. (1995).

2.2 Approach to Design

The overall objectives of the ML/ARD characterization are to obtain data that can be used as inputs to:

1. Waste management planning (for example, is the rock./tailings acid-generating and/or metal-leaching?) and
2. Impact assessment (what concentrations of metals and other components might leach from rock/tailings?).

Figure 1 illustrates the general flow of data collection to achieve the above objectives. The bulk geological and geochemical characteristics (indicated by the geological and lithogeochemical block models) are interpreted in the context of release rates and geochemical waste classification criteria, and are input into waste scheduling. The resulting waste composition allows information on release rates to be used in scale-up calculations, which in turn are used to develop water chemistry predictions.

The overall components therefore include the following:

1. Bulk characterization of the rock mass using geological and/or geochemical variables that can be used to model the waste characteristics for the purpose of waste management planning.
2. Correlation of the characteristics used for bulk characterization with relevant ML/ARD variables and development of criteria (e.g., neutralization potential/acid potential, net neutralization potential (NNP), correlation of metal leaching rates with bulk characteristics).
3. Prediction of contaminant release rates on a mass basis from rock and tailings under various disposal scenarios.
4. Determination of water quality controls (e.g., solubility limits, attenuation effects, etc.) for prediction of source term concentrations for individual facilities. Data obtained for this component will be used to adjust water quality predictions obtained from scale-up of laboratory kinetic tests.

All four components are relevant to both objectives, and the process is iterative. For example, the last component may indicate parameters that should be used for classification of waste leading to requirements for waste modelling in the first component (Figure 1). The studies have been designed to collect data for each of these components and for each potential source of water requiring a source term prediction in water quality impact assessment. Currently, the facilities anticipated in the mine plan are an open pit, separate disposal areas for rougher and scavenger tailings, and a construction fill area (primarily tailings dams). The current mine plans do not include sub-aerial waste-rock dumps but instead show underwater co-disposal of waste rock with scavenger tailings.

This sampling and analysis plan (SAP) describes the collection and analysis of samples to provide data on the bulk characteristics of the rock and tailings, and the selection of a sub-set of these samples to provide information on leaching characteristics.

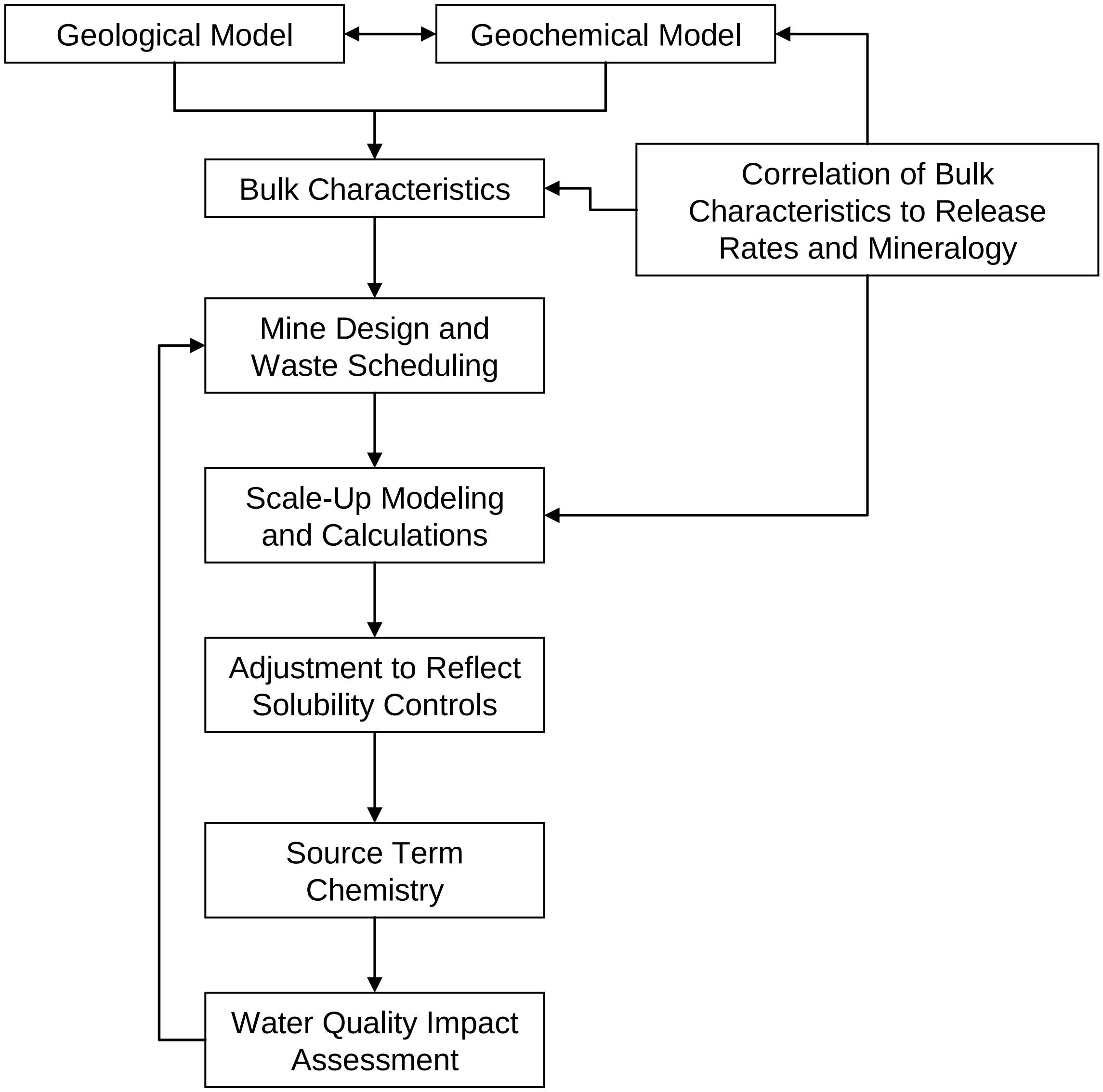

Figure 1. Flow chart showing data collection links.

3 Roles and Responsibilities

Table 1 summarizes roles and responsibilities for implementation of this SAP.

Table 1. Roles and responsibilities

Organization	Lead Person	Responsibilities
Northern Dynasty	Richard Moses	Sample collection and shipping, reject storage.
SRK Consulting	Stephen Day	Program design, SAP preparation, selection of laboratories, sample selection, liaison with testing laboratories, initial interpretation of incoming data and identification of data quality issues based on trends observed, data management.
Canadian Environmental and Metallurgical	Sohan Basra	Sample management, preparation of samples, initial analytical testwork (acid-base accounting), leach testing, data compilation
ALS	Fred Chan	Analysis of metal and sulfur concentrations in solids, analysis of leachates from leach tests
Process Research Associates	Morris Beattie	Scoping-level metallurgical testwork
SGS Lakefield under supervision of AMEC	Tony Lipiec (AMEC)	Detailed metallurgical testwork for feasibility study
EVS Environment Consultants	Robert Harrison	Toxicity testing on process water samples
Shaw Alaska, Inc.	Jane Whitsett	Quality control management

4 Sample Selection and Collection Methods

4.1 Introduction

Exploration drilling has occurred over several phases and provides the majority of candidate drill-core for ML/ARD testing. Cominco Alaska Incorporated initially conducted exploration drilling on the Pebble Deposit from 1989 through 1992. A second round of drilling was undertaken by Cominco in 1997. The most recent round of drilling was carried out by NDM over the period from 2002 to 2003. Additional exploration drilling was completed in 2004 and is ongoing in 2005.

Since the majority of drilling has been conducted on the mineralized core of the deposit, some of the drilling in 2004 was designed specifically by SRK to provide geochemical data on the rock that could potentially form the eventual pit walls. This program was designed based on understanding of pyrite distribution provided by the exploration drilling.

Core from exploration drill programs has been stored on site in wooden core boxes following core logging and sampling for assay and analysis. Stored core has been subject to ambient climatic conditions since drilling. Differences in the degree of weathering between older and newer core is expected to provide insight into material weathering rates under site conditions.

4.2 Mine Rock

Sample selection occurred in two rounds. The first round involved selection of samples from the pre-2004 exploration drill-hole database. In the second round, drill-core from the 2004 program was selected. These selection rounds are described separately below.

4.2.1 Pre-2004 Sample Selection

Database

SRK was supplied with Excel databases containing drill-hole lithological and assay data for the pre-2004 drilling. These databases were reviewed by SRK to select a large suite of samples for static geochemical testwork.

The sample selection was designed to ensure the following components are represented in the testwork:

- All lithologies,
- All alteration types and zones identified in the database, and
- The range of potential contaminant and sulfide values covering typical and extreme values.

As the core available for sampling has been in storage for variable lengths of time, representative samples of the same lithology were collected from old (Cominco) and new (NDM) core. The intent was to allow an assessment of the extent of natural oxidation that has occurred during core storage.

Selection Methodology

Since no previous ML/ARD sampling had been completed at the project, an arbitrary target number of samples was selected based on experience and review of the exploration database (which includes total sulfur analysis for the NDM drilling). The number of samples was 400.

Several iterative steps were followed to determine the drill-core for selection, as described below.

- The database included data from the Pebble Deposit and neighboring prospects. Therefore, all drill-holes located outside of the proposed pit area were eliminated by using the X-Y coordinates of the resource land for the Pebble Deposit.
- Within the resource land (Figure 2), drill-holes were selected to provide adequate spatial

coverage for the 2.5 billion tonne pit outline. Approximately five boreholes per 0.6 acres (2500 square meters) were initially selected. This was achieved by reference to the drill-hole collar plan.

- A catalogue of available core was provided by NDM, and further review of the database was limited to those drill-holes where core was available.
- Simplified lithological codes (the first character of the lithology codes) based on the major rock type identified were then assigned to each logged interval. The database was then sorted according to this simplified lithological code to allow examination of the characteristics of the individual lithologies.
- The lithological changes with depth in each drill-hole were then assessed using the database. From each lithological unit, samples were selected by considering the following parameters:
    - **Copper equivalent grade (CUEQ%, calculated by NDM from Cu + Au)**. This roughly indicates whether rock would be processed to recover commodities or disposed of as waste;
    - **Acid potential (AP) calculated from total S%** (units of kg $CaCO_3$ equivalent). This provides a maximum value for AP because not all sulfur may be in an acid-generating form.
    - **Semi-quantitative estimate of neutralization potential (NP) calculated from Ca%** (units of kg $CaCO_3$ equivalent). The assumption is that calcium concentrations will reflect carbonate content. This may underestimate actual NP if non-calcic carbonates are present but more likely overestimates NP due to the presence of other calcium minerals that will not effectively neutralize acid (sulfates and silicates);
    - **Pyrite content estimated from total sulfur less the sulfur associated with copper, zinc, and molybdenum**; and
    - **Na/K as an indicator of degree of alteration**.
- Each sample was selected to consist of 20 feet of core, which was composed of two 10-foot exploration sample intervals. The wider interval for ML/ARD testing was selected to reduce variability expected from local variations in mineralogy that would not be manageable during mining.
- To ensure samples selected were representative of geochemical variations within each lithology, scatter plots for each lithological type were carefully reviewed. Based on this gap analysis, further samples were selected to ensure all variations observed were represented in the intervals selected.

Table 2 summarizes the number of samples collected by lithology. Figure 2 shows the location of drill-holes selected. Appendix A lists the samples requested.

Table 2. Number of samples of each rock type selected

Stratigraphic Section	Rock Type	Unit Designation	N
Quaternary Deposits	Ferricrete	Fc	2
	Overburden	Ob	8
Tertiary Rocks	Sedimentary Units	TC/TW/TY	24
	Volcanic Units	TA/TB/TD	17
Cretaceous Stratiform and Cross-cutting Plutonic Rocks	Diorite/Gabbro	D	45
	Granodiorite-Quartz-Monzodiorite	G (Gp and Gs)	70
	Monzodiorite	N	39
	Monzonite	F (and X2)	17
	Monzonite (near Stock A)	M	12
	Intrusion Breccia	X	23
	Porphyritic Monzodiorte to Quartz Monzodiorite	P	13
	Skarn	K	5
Jurassic to Cretaceous Sedimentary and Volcano-sedimentary Rocks	Andesitic Bedded Rocks (Argillite, Siltstone)	Y	90
	Andesitic Bedded Rocks (Volcaniclastic Sandstone, Wacke)	W	8
Other		R	17
		Z	9

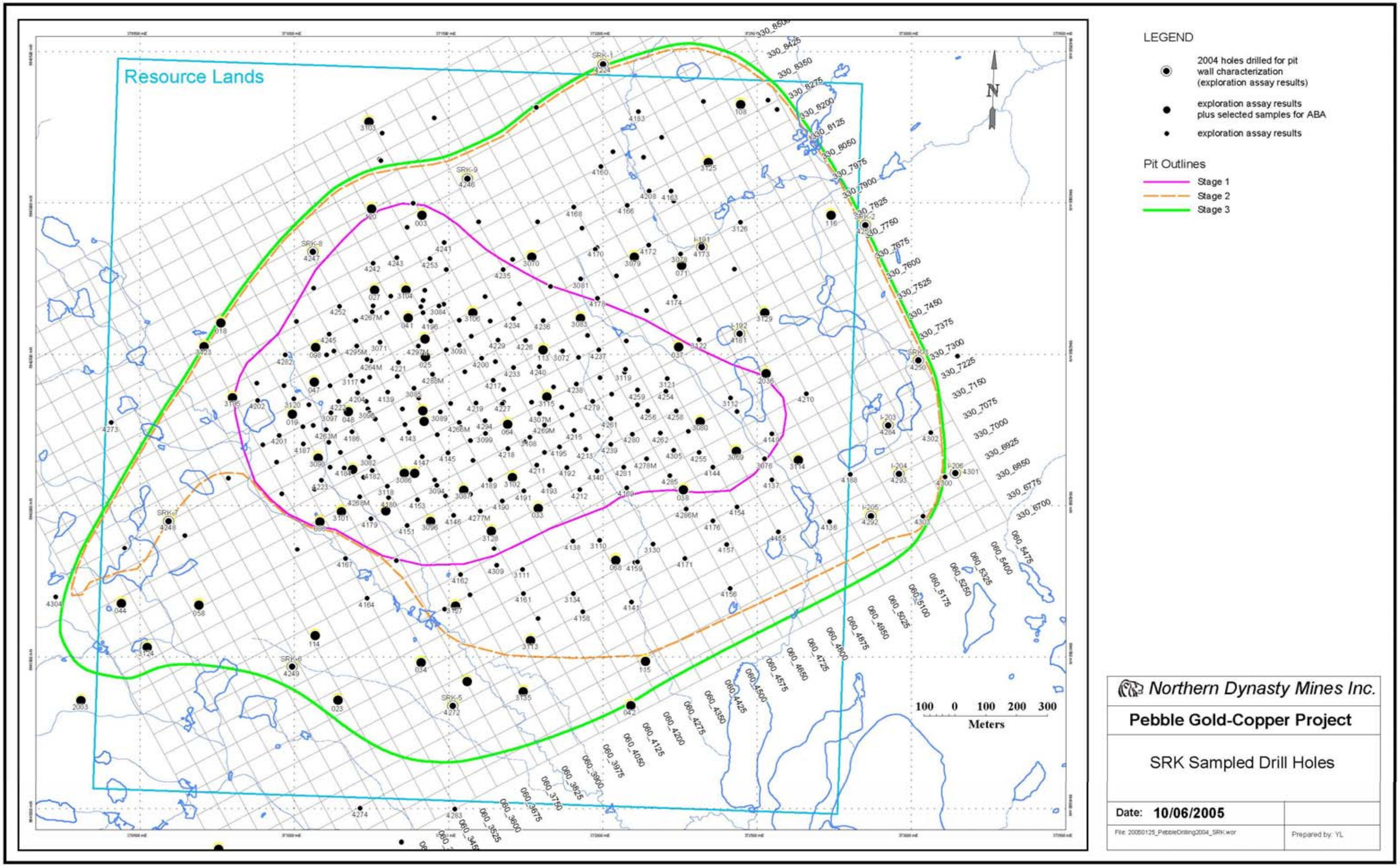

FIGURE 2. Location of Drill-holes Sampled

Collection Methodology

The sample selection list was sent to NDM (Richard Moses) in May 2004 for sample collection from core boxes. All samples were collected as splits or whole core over the intervals requested in June 2004, and bagged and shipped to NDM's warehouse in the Vancouver area. SRK examined the samples primarily to ensure that the selection of 20-foot composite samples would not result in combining lithologically distinctive materials. Examination of the core also increased understanding of the characteristics of the various rock types and allowed oxidation of the older core to be viewed.

Selection of Samples for Shake Flask Extractions and Hydrogen Peroxide Extractions

The objective of shake flask extractions is to evaluate the accumulation and solubility of contaminant load under a range of pH conditions. The distribution of paste pH in the acid-base accounting results was used as a basis for selection of samples. Paste pH tends to overestimate actual pH of rock at low pHs due to the liberation of reactive carbonate and silicate fines by pulverization prior to ABA testing. Experience indicates that paste pHs below 5 are typically 1 pH unit higher than the coarse crushed rock. Therefore, paste pHs were grouped into the following categories for sample selection:

- Group 1 — Paste pH <5.5 (actual pH <~4.5) – Rock pH controlled by soluble aluminum and ferric iron species.
- Group 2 — Paste pH between 5.5 and 7 – Rock with pH controlled by soluble aluminum and copper species.
- Group 3 — Paste pH greater than 7 – Pre-Tertiary rock (elevated S) with pH controlled by carbonate mineral solubility.
- Group 4 — Paste pH greater than 7 – Tertiary rock (low S) with pH controlled by carbonate mineral solubility.

Samples were chosen separately for Groups 3 and 4 to reflect the major differences in the rock types and possible differences in solubility of potential contaminants.

The target number for shake flask extractions for this testing was defined as 30. For Groups 1 and 2, the target number of samples was 10 each. For Groups 3 and 4, the target was five samples each. Selection of actual samples within the group was made using a random number generator. The target proportion of samples in each group was selected based on the proportion of available samples to target (Table 3). Each sample was assigned a random number which was compared to the proportion. If the random number was less than the proportion, the sample was selected. The resulting numbers of samples selected from each pH group are shown in Table 3. Appendix B provides the list of samples selected.

Table 3. Tally of samples selected for shake flask extractions

pH Group	Available Samples	Target	Actual
1	39	10	11
2	72	10	11
3	214	5	4
4	51	5	6

Selection of Samples for Kinetic Testing

Results from the testing of drill-core were used to select samples for kinetic testing. The following primary criteria were considered when selecting humidity cell samples:

- **Age of the Core**. The varying age of the core enables testing of material that has already undergone oxidation and therefore potentially indicates weathering rates beyond the usual time frame for kinetic testing and project permitting.
- **Sulfur Content**. Rates of oxidation are invariably correlated with sulfur content. Testing of materials with a range of sulfur concentrations enables oxidation rates to be interpolated beyond the dataset.
- **Rock Type**. Rock type may be a factor due to differences in style of mineralization and gangue mineralogy. At least 15 different rock types have been identified, though at present the only relationships to rock type are the differences between the mineralized rock and Tertiary cover. For the mineralized rock, the different rock types were grouped into two logical major groups (country rock and intrusion), but the final selections were also checked to ensure that samples were selected from the major intrusive rock types.

Appendix C provides the list of samples selected. Table 4 summarises sample selection by rock type and sulfide content.

Table 4. Sample selection matrix for humidity cells

	Core Age	1. 1989-1992			2. 1997			3. 2002-2003		
Rock Types	**Sulfur as Sulfide Concentration Range, %**	**i. <1.5**	**ii. 1.5 to 2.5**	**iii. >2.5**	**i. <1.5**	**ii. 1.5 to 2.5**	**iii. >2.5**	**i. <1.5**	**ii. 1.5 to 2.5**	**iii. >2.5**
Tertiary Cover	**Sediments**	2								
	Volcano-Sediments	2								
Tertiary Intrusions	**Basalt Dykes**	2								
Intrusions	**A. Plutonic Rocks**	1Ai[1]	1Aii	1Aiii	2Ai	2Aii	2Aiii	3Ai	3Aii	3Aiii
Host Rocks	**B. Sedimentary and Volcano-sedimentary Units**	1Bi	1Bii	1Biii	NS[2]	2Bii	2Biii	3Bi	3Bii	3Biii

Notes:
1. Designation of samples in Appendix C.
2. NS — Dataset contains only one sample. No test proposed.

4.2.2 2004 Sample Selection

In 2004, 16 diamond drill-holes were completed on the periphery of the deposit near the projected ultimate pit walls. Eight of these holes were specifically sited to collect information for the ML/ARD program. The locations of these holes are shown in Figure 2.

A total of 1216 samples from these holes were submitted for analysis on 10-foot intervals. Based on the exploration results, 134 samples were selected for static geochemical analysis. These samples were selected on typically 20-foot intervals evenly spaced along the drill-core. Total proportion of core selected for the additional testing was 20 percent with a greater emphasis on the Tertiary cover materials.

Appendix D provides a list of samples selected.

4.3 Tailings

Geochemical characterization of tailings is closely tied to metallurgical testing. Samples of tailings are generated as a by-product metallurgical testing. The composites used in the metallurgical testing are designed by the project metallurgical consultants.

To date, tailings samples are available from two rounds of metallurgical testing which have each generated two main tailings streams. The majority of tailings report to rougher tailings which are produced by bulk flotation of sulfide minerals. This produces a sulfide mineral concentrate. Commodity minerals are floated from this concentrate resulting in a final pyritic tailings product.

Additional metallurgical testwork is planned for 2005 to refine the processing of ore.

The samples provided for ML/ARD testing are tailings solids and supernatant.

5 Analytical Procedures

5.1 Analytical Contractors

The team of Canadian Environmental and Metallurgical Incorporated (CEMI), ALS Environmental (ALS), and ALS Chemex (Chemex) was selected to carry out the laboratory testing and analysis.

5.2 Static Testing

Seven groups of static tests are used for rock drill-core and samples of tailings produced by metallurgical testwork (Table 5). These include routine acid-base accounting (ABA) tests (MEND, 1991), conventional neutralization potential (Sobek et al., 1978) for comparison with the MEND method, distilled water extraction tests (Price, 1997), Meteoric Water Mobility Procedure tests (NDEP, 1996), hydrogen peroxide shake flask extraction tests (Tran et al., 2003), major and trace metal analysis (EPA standard methods), and grain-size determinations (internal method). Tables 6, 7, and 8 list the analytical methods.

Table 5. Static testing procedures and descriptions

Analysis Group	Method Reference	Brief Description
Routine ABA	MEND (1991)	Total sulfur (0.01%), sulfate sulfur as HCl-soluble sulfate (0.01%), modified neutralization potential, total inorganic carbon (0.02% as C), and paste pH. Detection limits are indicated in brackets.
Neutralization Potential	Sobek et al. (1978)	
Rock Metal Analysis	See Table 6	
Shake Flask Extraction	Price (1997)	Leachate analysis for parameters indicated in Table 7.
Meteoric Water Extraction Procedure	Nevada Department of Environmental Protection (1996)	Leachate analysis for parameters indicated in Table 7.
Hydrogen peroxide shake flask	Tran et al. (2003)	Modification of shake flask extraction test above using mild peroxide solution.
Grain-size analysis	SRK standard operating procedure	Size-fraction analysis using screens at 6.25 mm. 10 mesh, and 20 mesh.

Table 6. Methods for rock analysis

Parameter	Limit of Reporting	Units	Method
Sulfate	100	mg/kg	E300.0
Al	10	mg/kg	E200.8
Sb	0.05	mg/kg	E200.8
As	0.1	mg/kg	E200.8
Ba	10	mg/kg	E200.8
Be	0.05	mg/kg	E200.8
Bi	0.01	mg/kg	E200.8
B	10	mg/kg	E200.7
Cd	0.01	mg/kg	E200.8
Ca	10	mg/kg	E200.7
Cr	1	mg/kg	E200.8
Co	0.1	mg/kg	E200.8
Cu	0.2	mg/kg	E200.8
Fe	10	mg/kg	E200.7
Pb	0.2	mg/kg	E200.8
Mg	10	mg/kg	E200.7
Mn	5	mg/kg	E200.8
Hg	0.01	mg/kg	SW7471
Mo	0.05	mg/kg	E200.8
Ni	0.2	mg/kg	E200.8
K	10	mg/kg	E200.7
Se	0.2	mg/kg	E200.8
Ag	0.01	mg/kg	E200.8
Na	10	mg/kg	E200.7
Tl	0.02	mg/kg	E200.8
Sn	0.2	mg/kg	E200.8
Ti	10	mg/kg	E200.8
U	0.05	mg/kg	E200.8
V	1	mg/kg	E200.8
Zn	2	mg/kg	E200.8

Table 7. Leachate analysis methods

Parameter	Maximum Method Reporting Limit	Units	Method
Inorganics			
pH	0.01	pH units	E150.1
Eh	NA	mV	
Conductivity	2	μmhos/cm	SM 2510B
Acidity	1	mg $CaCO_3$/L	E305.1
Alkalinity	1	mg/L	SM2320B
Chloride	0.2	mg/L	E300.0
Fluoride	0.1	mg/L	E300.0
Hardness	0.5	mg/L	Calculated from Ca and Mg
Sulfate	0.2	mg/L	E300
TDS	10	mg/L	E160.1
Metals (Dissolved)			
Al	1	μg/L	ICPMS (200.8)
Sb	0.05	μg/L	ICPMS (200.8)
As	0.1	μg/L	ICPMS (200.8)
Ba	0.05	μg/L	ICPMS (200.8)
Be	0.2	μg/L	ICPMS (200.8)
Bi	0.5	μg/L	ICPMS (200.8)
B	10	μg/L	ICPMS (200.8)
Ca	50	μg/L	ICPMS (200.8)
Cd	0.05	μg/L	ICPMS (200.8)
Co	0.1	μg/L	ICPMS (200.8)
Cr	0.5	μg/L	ICPMS (200.8)
Cu	0.1	μg/L	ICPMS (200.8)
Fe	30	μg/L	ICPMS (200.8)
Pb	0.05	μg/L	ICPMS (200.8)
Mg	5	μg/L	ICPMS (200.8)
Mn	0.05	μg/L	ICPMS (200.8)
Hg	0.010	μg/L	EPA 1631E (CVAFS)
Mo	0.05	μg/L	ICPMS (200.8)
Ni	0.5	μg/L	ICPMS (200.8)
K	50	μg/L	ICPMS (200.8)
Se	1	μg/L	ICPMS (200.8)
Si	50	μg/L	ICPMS (200.8)
Ag	0.01	μg/L	ICPMS (200.8)
Na	2000	μg/L	ICPMS (200.8)
Tl	0.05	μg/L	ICPMS (200.8)
Sn	0.1	μg/L	ICPMS (200.8)
V	0.5	μg/L	ICPMS (200.8)
Zn	1	μg/L	ICPMS (200.8)

Table 8. Kinetic testing procedures and descriptions

Analysis Group	Method Reference	Brief Description
Waste rock humidity cell	ASTM D5744-96 (modified)	The overall procedure is consistent with the ASTM procedure. Testing will be performed on 5 kg of material crushed to approximately 1”. Analyze all leachates for pH, Eh, and Conductivity and every other cycle leachate for all other parameters shown in Table 7.
Tailings humidity cell	ASTM D5744-96 (modified)	The overall procedure is consistent with the ASTM procedure. Testing will be performed on 3 kg of material. Analyze all leachates for pH, Eh, and Conductivity and every other leachate for all other parameters shown in Table 7
Waste rock column	SRK standard operating procedure	Approximately 5 kg crushed to approximately 1”. Water will be added as a trickle leach. Volume of water will be determined by volume of rock used for test and will be specified by SRK. Analyze all leachates for pH, Eh, and Conductivity and every other leachate for all other parameters shown in Table 7. Columns are configured so that they can be flooded to simulate subaqueous storage of waste material.
Tailings Column	SRK standard operating procedure	Approximately 3 kg of tailings. Water will be added as a trickle leach. Volume of water will be determined by volume of rock used for test and will be specified by SRK. Analyze all leachates for pH, Eh, and Conductivity and every other leachate for all other parameters shown in Table 7. Columns should be configured so that they can be flooded to simulate subaqueous storage of waste material.

5.3 Kinetic Testing

Two main types of humidity cells are being used.

- Rock and tailings are both being tested in humidity cells modified from ASTM D5744-96. The modification involves a direct scale-up to a larger sample mass of 5 kilograms and 3 kilograms, respectively. Rock is crushed to pass a 1-inch screen rather than a 1/4-inch screen. The volume of leachate is increased in proportion to the sample size increase. The increase for waste rock in particular was needed to address the occurrence of mineralization in veinlets. The coarser particle size allows greater exposure of mineralization on fracture faces as is expected to occur under site conditions during blasting.
- Rock and tailings are also tested in columns either separately or co-mingled to evaluate disposal options. Standard methods are not available for this type of testwork, therefore specific methods were designed.

5.4 Toxicity Testing

Toxicity testing is being performed on tailings supernatant samples by EVS Environment Consultants to predict the toxicity of process water. Samples for this procedure are collected by the metallurgical testing laboratory in plastic containers and shipped in coolers to EVS without preservation. Procedures used are summarized in Table 9.

Table 9 Toxicity testing procedures and descriptions

Test	Method
96-hour rainbow trout LC50	Environment Canada EPS 1/RM/13, Second Edition, 2000
48-hour *Daphnia magna* LC50	Environment Canada EPS 1/RM/14, Second Edition, 2000

6 Quality Assurance/Quality Control

Quality assurance for the Pebble geochemical characterization program is provided by the systematic sample selection procedures described in Section 3 and by the internal laboratory systems in place at the analytical laboratories. Data quality control is provided through a system of blank and duplicate sample analysis. Data quality on test leachates is reviewed by NDM's quality control manager

6.1 Static Testing

For ABA, metal testing, and shake flask testing, the analytical laboratory tests a duplicate of every tenth ABA sample submitted.

Three duplicate samples were run and one shake flask leachate blank was submitted for the 1989 to 2003 core.

6.2 Kinetic Testing

Quality control measures for kinetic testing includes:

- Humidity cell containing no sample but operated with same procedures (blank test) for both rock and humidity cells tests. This test evaluates potential contamination from cell construction materials and laboratory dust.
- Triplicates on two samples.

This draft report, **1CN007.000 – Metal Leaching/Acid Rock Drainage Characterization, Sampling and Analysis Plan**, has been prepared by:

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Appendices

Appendix A

List of Rock Samples Selected for Static Testing (pre-2004 Database)

APPENDIX A
List of Rock Samples Selected for Static Testing (pre-2004 Database)

Sample ID	DDH	Start m	Finish m	Rock Type
013-0107-0117	13	107	117	G
013-0117-0127	13	117	127	G
018-0074-0095	18	74	95	D
018-0135-0155	18	135	1055	D/D
018-0225-0245	18	225	245	D/D
019-0030-0051	19	30	51	OB
019-0072-0090	19	72	90	WY
019-0200-0220	19	200	220	N.Y
019-0240-0260	19	240	260	Y
019-0390-0410	19	390	410	Gp-Pl
025-0179-0199	25	179	199	Y
025-0453-0473	28	453	473	Y
025-0617-0637	25	617	637	D
027-0070-0090	27	70	90	Y
027-0110-0130	27	110	130	W
027-0200-0220	27	200	220	Y
027-0260-0280	27	260	280	Y
033-0137-0155	33	137	155	Y
033-0304-0323	33	304	323	TBpd
033-0343-0363	33	343	363	G-P
034-0060-0090	34	60	90	OB
034-0100-0117	34	100	117	X.DbGY
037-0062-0093	37	62	93	TC - basalt
037-0122-0161	37	122	161	TC - cng
037-0161-0182	37	161	182	TC - cng
041-0000-0020	41	0	20	Fc
041-0020-0040	41	20	40	Y
041-0094-0114	41	94	114	Y
041-0244-0260	41	244	260	N
041-0280-0300	471	280	300	D
041-0500-0520	41	500	520	Z
041-0538-0558	41	538	558	Y
041-0728-0748	41	728	748	q
042-0060-0075	42	60	75	Y
042-0271-0290	42	271	290	D/G
042-0360-0380	42	360	380	Yb
044-0190-0210	44	190	210	Gp
044-0225-0245	44	225	245	X.HGDN-YxN/D
044-0305-0325	44	305	325	N.H
044-0343-0363	44	343	363	Gp
046-0038-0063	46	38	63	Fc
046-0113-0133	46	113	133	N or Gp-p.YM
046-0195-0215	46	195	215	Y
046-0259-0279	46	259	279	N or Gp.YM
046-0308-0328	46	308	328	G-p
046-0363-0383	46	363	383	N or Gp.YD-M
046-0563-0580	46	563	580	N-p
046-0580-0600	46	580	600	GxN
047-0117-0136	47	117	136	Wy
047-0226-0246	47	226	246	Wy

APPENDIX A

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Sample ID	DDH	Start m	Finish m	Rock Type
047-0350-0365	47	350	365	Wy
047-0462-0482	47	462	482	Gph
047-0592-0612	47	592	612	Gph
048-0135-0155	48	135	155	Gp
048-0172-0190	48	172	190	Z / Gp
048-0200-220	48	200	220	Gp
048-0760-0780	48	760	780	Gp
058-0058-0078	58	58	78	P-k
058-0348-0368	58	348	368	P
058-0378-0398	58	378	398	N
058-0398-0418	58	398	418	Z.NPY
058-0428-0448	58	428	448	X.DPYxN
064-0000-0030	64	0	30	OB
064-0030-0050	64	30	50	G
064-0132-0147	64	132	147	G
064-0156-0176	64	156	176	Y
064-0499-0519	64	499	519	Y-W
064-0539-0554	64	539	554	D/G
068-0046-0066	68	46	66	Z.Y
068-0095-0115	68	95	115	D
068-0235-0255	68	235	255	D
068-0265-0285	68	265	285	Y-x
068-0500-0520	68	500	520	G
071-0313-0333	71	313	333	R/Db
071-0353-0373	71	353	373	R/Db
071-0423-0443	71	423	443	R/Db
071-0473-0493	71	473	493	R/Db
076-0438-0458	76	438	458	D/N
076-0518-0538	76	518	538	D/N
076-0608-0625	76	608	625	G/N?
086-0000-0067	86	0	67	OB
086-0279-0287	86	279	287	TBd
086-0363-0377	86	363	377	Np
086-0417-0437	86	417	437	Gp-k
086-0467-0487	86	467	487	N.MH
086-0617-0637	86	617	637	X.Db GN
093-0043-0063	93	43	63	G-p
093-0133-0148	93	133	148	G-p
093-0158-0178	93	158	178	Y
093-0248-0268	93	248	268	Y
093-0377-0394	93	377	394	Y
098-0151-0171	98	151	171	Y
098-0191-0211	98	191	211	Z.Y / Y
098-0241-0261	98	241	261	Y
098-0572-0592	98	572	592	Gph
098-0642-0662	98	642	662	Gph
108-0633-0650	108	633	650	Y
108-0770-0790	108	770	790	G
112-0160-0180	112	160	180	N.NM / N.YM
112-0220-0240	112	220	240	N.H

APPENDIX A

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Sample ID	DDH	Start m	Finish m	Rock Type
112-0300-0320	112	300	320	N.H
112-0400-0420	112	400	420	N.H
112-0460-0480	112	460	480	X.MDbxN
113-0040-0060	113	40	60	Y
113-0090-0110	113	90	110	Y
113-0170-0190	113	170	190	G-p
113-0360-0380	113	360	380	Y
113-0510-0530	113	510	530	Y
114-0055-0062	114	55	62	Pp
114-0090-0104	114	90	104	Pp
114-0180-0200	114	180	200	Ppk / P-k
114-0290-0303	114	290	303	Ppk
114-0310-0330	114	310	330	X.MDxN
114-0400-0420	114	400	420	X.MD#b
114-0460-0481	114	460	481	X.MD#b
115-0014-0024	115	14	24	TC- Oxidized
115-0024-0034	115	24	34	TC- Arkose
115-0041-0054	115	41	54	TC - Cng
115-0054-0066	115	57	66	TC - Slst
115-0104-0123	115	104	123	TC - Slst
115-0142-0163	115	142	163	TC - Arkose
115-0197-0215	115	197	215	TC - Cng
115-0232-0264	115	232	264	TC - Cng/mdst
115-0280-0300	115	280	300	TA pd
115-0300-0320	115	300	320	Y-W
115-410-0430	115	410	430	Y
116-0570-0590	116	570	590	Gp
116-0630-0650	116	630	650	Gp
116-0780-0802	116	780	802	Gp
116-0890-0908	116	890	908	Y
117-0000-0053	117	0	53	OB
117-0070-0090	117	70	90	N.M
117-0160-0174	117	160	174	MpK-N
117-0190-0210	117	190	210	N.YM
117-0233-0250	117	233	250	Mp-K
117-0300-0320	117	300	320	Gp-K
117-0560-0579	117	560	579	GpK
117-0590-0610	117	590	610	Y
117-0630-0650	117	630	650	Y
117-1055-1071	117	1055	71	TBd
118-0150-0170	118	150	170	N-.Y
118-0190-0210	118	190	210	Z.N
118-0220-0240	118	220	240	Y
118-0260-0278	118	260	278	Y
118-0336-0355	118	336	355	TbD
118-0390-0410	118	390	410	TBd
118-0468-0488	118	468	488	Mkp-x
118-0497-0515	118	497	515	N/D.-YM
118-0520-0535	118	520	535	Y
118-0565-0585	118	565	585	Y

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Sample ID	DDH	Start m	Finish m	Rock Type
118-0650-0670	118	650	670	D/N-.#b
118-0710-0730	118	710	730	Np-.#b D?
118-0760-0780	118	760	780	D
118-0890-0910	118	890	910	N/D
118-0980-1000	118	980	1000	N-p-.Y / N-.Y-D
118-1040-1060	118	1040	1060	N.Y-D
118-1220-1238	118	1220	1238	WY
118-1300-1320	118	1300	1320	Y
118-1480-1500	118	1480	1500	X.YxN
120-0075-0095	120	75	95	B
120-0116-0130	120	116	130	R/Db
120-0260-0280	120	260	280	R/Db
120-0380-0400	120	380	400	R/Db
2001-0130-0150	2001	130	150	Kqs
2003-0210-0230	2003	210	230	Kgde
2003-0335-0356	2003	335	356	Kgde
2026-0050-0070	2026	50	70	Kq
2026-0190-0210	2026	190	210	Kq
2028-0055-0076	2028	55	76	G/N
2028-0155-0175	2028	155	175	Y
2028-0310-0330	2028	310	330	G
2028-0430-0450	2028	430	450	Y
2036-0421-0440	2036	421	440	W
2036-0500-0520	2036	500	520	G-p
2036-0540-0564	2036	540	564	Y
2036-0570-0590	2036	570	590	G-p
2036-0660-0682	2036	660	682	G-p
2036-0700-0720	2036	700	720	G-p
3069-0127-0147	3069	127	147	D
3069-0247-0267	3069	247	267	Z
3069-0287-0307	3069	287	307	G
3069-0347-0367	3069	347	367	D
3069-0397-0417	3069	397	417	D
3069-0427-0437	3069	427	437	Y
3069-0487-0507	3069	487	507	Y
3069-0627-0647	3069	627	647	Y
3069-0707-0727	3069	707	727	G
3069-0807-0827	3069	807	827	G
3069-0927-0947	3069	927	947	G
3070-0074-0094	3070	74	94	D
3070-0204-0224	3070	204	224	D
3070-0284-0304	3070	284	304	D
3070-0464-0484	3070	464	484	Y
3070-0594-0614	3070	594	614	G-p
3070-0634-0654	3070	634	654	G-p
3079-0499-0519	3079	499	519	D
3079-0589-0599	3079	589	599	Tad
3080-0075-0095	3080	75	95	D
3080-0129-0149	3080	129	149	G
3080-0179-0199	3080	179	199	G

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Sample ID	DDH	Start m	Finish m	Rock Type
3080-0375-0394	3080	375	394	D
3080-0394-0419	3080	394	419	Y
3080-0479-0499	3080	479	499	Y
3080-0549-0569	3080	549	569	G^f
3080-0669-0689	3080	669	689	G^f
3083-0599-0619	3083	599	619	Y
3083-0639-0652	3083	639	652	Y
3083-0719-0739	3083	719	739	Y
3086-0949-0969	3086	949	969	N.M
3086-0979-0992	3086	979	992	N.MY/ TBd
3086-1009-1027	3086	1009	1027	P-K
3086-1109-1121	3086	1109	1121	Y
3086-1121-1126	3086	1121	1126	TBd
3086-1236-1255	3086	1236	1255	N
3086-1319-1338	3089	1319	1338	G
3087-0023-0040	3087	23	40	Y
3087-0164-0171	3087	164	171	G
3087-0171-0181	3087	171	181	G
3087-0209-0229	3087	209	229	Y
3087-0359-0379	3087	359	379	Y
3087-0509-0528	3087	509	528	Y
3087-0539-0559	3087	539	559	D
3087-0787-0809	3087	787	809	Dxq/D
3087-0869-0889	3087	869	889	Yxq
3087-0905-0919	3087	905	919	Mk.Y
3087-0979-0999	3087	979	999	M
3087-1047-1067	3087	1047	1067	YxN/N.Y / YXNYxq
3087-1143-1159	3087	1143	1159	X.YP
3096-0000-0058	3096	0	58	OB
3096-0058-0078	3096	58	78	X.YMzN(?) / X.YM-DxN
3096-0108-0128	3096	108	128	X.YM-DxN
3096-0168-0188	3096	168	188	N.DyM
3096-0235-0258	3096	235	258	Y
3096-0318-0338	3096	318	338	Y
3096-0418-0438	3096	418	438	Y
3096-0718-0738	3096	718	738	X
3096-0788-0808	3096	788	808	N
3096-1006-1018	3096	1006	1018	X
3096-1088-1108	3096	1088	1108	TBd
3096-1328-1348	3096	1328	1348	M
3096-1388-1408	3096	1388	1408	P
3096-1518-1538	3096	1518	1538	P
3096-1748-1768	3096	1748	1768	G-q
3098-0138-0158	3098	138	158	N-p
3098-0238-0258	3098	238	258	Mpk / M-k
3098-0353-0371	3098	353	371	M-k
3098-0418-0438	3098	418	438	Y
3098-0488-0508	3098	488	508	Y-xk-pd
3098-0656-0676	3098	656	676	Y-W
3098-0712-0727	3098	712	727	G

APPENDIX A
List of Rock Samples Selected for Static Testing (pre-2004 Database)

Sample ID	DDH	Start m	Finish m	Rock Type
3098-0778-0792	3098	778	792	G
3098-0908-0928	3098	908	928	G
3098-1198-1218	3098	1198	1218	G
3101-0110-0138	3101	110	138	X.M/Mx
3101-0240-0262	3101	240	262	Yxqd
3101-0308-0346	3101	308	346	TD
3101-0378-0398	3101	378	398	Yxq-p
3101-0548-0568	3101	548	568	Yxqp / Yxq-p\
3101-0738-0761	3101	738	761	M.ky/X.mk
3101-0978-0995	3101	978	995	YxP\P/M-k / Y-x
3101-1038-1058	3101	1038	1058	Mp-k
3101-1161-1172	3101	1161	1172	TBd
3101-1201-1208	3101	1201	1208	TBd
3101-1226-1236	3101	1226	1236	TBd
3102-0044-0068	3102	44	68	Y
3102-0088-0098	3102	88	98	G^fp
3102-0254-0276	3102	254	276	TBd
3102-0398-0418	3102	398	418	Y
3102-0568-0588	3102	568	588	Y
3102-0623-0638	3102	623	638	D
3102-0798-0818	3102	798	818	D
3102-0938-0952	3102	938	952	D
3102-0958-0978	3102	958	978	TBd
3102-1074-1078	3102	1074	1078	Y
3103-0036-0056	3103	36	56	R
3103-0129-0143	3103	129	143	R / *qp
3103-0159-0172	3103	159	172	R
3103-0176-0196	3103	176	196	R
3103-0236-0252	3103	236	252	R
3103-0376-0393	3103	376	393	R
3103-0546-0566	3103	546	566	R
3103-0617-0636	3103	617	636	R
3103-0786-0797	3103	786	797	R
3103-0888-0901	3103	888	901	R
3104-000-0018	3104	0	18	O/B
3104-0077-0098	3104	77	98	G^p
3104-0128-0148	3104	128	148	G^p
3104-0238-0258	3104	238	258	G^p
3104-0378-0398	3104	378	398	Y
3104-0458-0480	3104	458	480	M/P
3104-0538-0558	3104	538	558	Y
3104-0588-0608	3104	588	608	N-p
3104-0718-0738	3104	718	738	Y
3104-0848-0868	3104	848	868	P
3104-0978-0998	3104	978	998	Y
3104-1228-1244	3104	1228	1244	D
3104-1328-1346	3104	1328	1346	D
3104-1458-1478	3104	1458	1478	Y
3105-0138-0158	3105	138	158	N
3105-0198-0208	3105	198	208	N

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List of Rock Samples Selected for Static Testing (pre-2004 Database)

Sample ID	DDH	Start m	Finish m	Rock Type
3105-0268-0278	3105	268	278	G^c
3105-0418-0438	3105	418	438	G^c
3105-0638-0653	3105	638	653	G^c
3105-1008-1028	3105	1008	1028	G^c
3105-1138-1158	3105	1138	1158	G^c
3105-1284-1300	3105	1284	1300	Z
3105-1313-1332	3105	1313	1332	Z.TBd / Z
3105-1332-1369	3105	1332	1369	TBd
3105-1388-1408	3105	1388	1408	G^c
3106-0020-0033	3106	20	33	D
3106-0158-0178	3106	158	178	D
3106-0236-0258	3106	236	258	Y
3106-0548-0568	3106	548	568	D
3106-0758-0778	3106	758	778	Y
3106-0908-0928	3106	908	928	Y
3106-1128-1148	3106	1128	1148	Y
3106-1288-1308	3106	1288	1308	Y
3113-0019-0037	3113	19	37	N / F.FD
3113-0157-0177	3113	157	177	N/F-D.Y
3113-0347-0357	3113	347	357	N.FDZ / N/DX
3113-0787-0807	3113	787	807	F.F-Dy
3113-0981-1002	3113	981	1002	F.H(FDY)
3114-0196-0213	3314	196	213	TC^k - Volc Cng
3114-0266-0283	3314	226	283	TC^k - Volc Cng
3114-0283-0301	3114	283	301	TC^k - Volc Cng
3114-0392-0410	3114	392	410	TC^k - Volc Cng
3114-0410-0427	3114	410	427	TC^k - Basalt
3114-0449-0469	3114	449	469	YW
3114-0609-0629	3114	609	629	Y
3114-0699-0709	3114	699	709	G^m
3114-0779-0799	3114	779	799	G^m
3114-1019-1036	3114	1019	1036	G^m
3114-1059-1079	3114	1059	1079	Y
3115-0678-0698	3115	678	698	D
3115-0768-0788	3115	768	788	D
3115-0838-0858	3115	838	858	D
3115-0988-1008	3115	988	1008	Y
3116-0935-0958	3116	935	958	M?
3116-1018-1038	3116	1018	1038	YxP/M
3116-1248-1268	3116	1248	1268	WC?
3116-1348-1368	3116	1348	1368	G
3123-0148-0168	3123	148	168	X.H(DNNxY)
3123-0178-0198	3123	178	198	X.H(DNNxY)
3123-0248-0268	3123	248	268	Yxbp(I?)
3123-0438-0458	3123	438	458	D? / Dp
3123-0488-0503	3123	488	503	Dp
3123-0648-0668	3123	648	668	D
3123-0744-0766	3123	744	766	X.HxN/X.YxN
3124-0000-0137	3124	0	137	OB
3124-0188-0209	3124	188	209	Y

APPENDIX A
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Sample ID	DDH	Start m	Finish m	Rock Type
3124-0328-0348	1055	328	348	N/P / N
3124-0388-0408	3124	388	408	N/P
3124-0428-0450	3124	428	450	N/P / N
3124-0518-0538	3124	518	538	N/P
3124-0872-0887	3124	872	887	X.HxN^f
3124-1218-1235	3124	1218	1235	TB
3125-0099-0119	3125	99	119	D
3125-0239-0259	3125	239	259	D
3125-0349-0369	3125	349	369	D
3125-0379-0399	3125	379	399	D
3125-0719-0739	3125	719	739	D
3125-0919-0933	3125	919	933	D/R
3125-1049-1069	3125	1049	1069	N
3128-0039-0056	3128	39	56	D
3128-0076-0098	3128	79	98	X.FDM/pxn/p^f
3128-0298-0323	3128	298	323	X.FDM/pxn/p^f
3128-0518-0538	3128	518	538	P/N.DN/p
3128-0658-0678	3128	658	678	X.DFxN/P\P/N.DF
3128-0738-0758	3128	738	758	P.DF
3128-0808-0828	3128	808	828	P.DF
3128-0938-0958	3128	938	958	X.DFxN/P/N/P.DF
3129-0080-0100	3129	80	100	TC - And/Volc cng
3129-0100-0119	3129	100	119	TC - And/Volc cng
3129-0234-0253	3129	234	253	TC - And/Volc cng
3129-0253-0272	3129	253	272	TC - And/Volc cng
3129-0399-0417	3129	388	417	TC - And/Volc cng
3129-0417-0435	3129	417	435	TC - And/Volc cng
3129-0453-0470	3129	453	470	TC - Volc cng
3129-0470-0489	3129	470	489	TC - Volc cng
3129-0550-0574	3129	550	574	Y
3129-0574-0590	3129	574	590	Gp
3129-0610-0630	3129	610	630	Gp
3129-0970-0980	3129	970	980	Y
3129-1200-1220	3129	1200	1220	Y
3129-1220-1240	3129	1220	1240	Y
3129-1300-1320	3129	1300	1320	G
3133-0100-0118	3133	100	118	X2
3133-0348-0368	3133	348	368	X2xx2qpw
3133-0668-0688	3133	668	688	X2
3133-0688-0708	3133	688	708	Fh
3133-0758-0778	3133	758	778	Fh
3133-0808-0828	3133	808	828	X2
3133-1148-1168	3133	1148	1168	X2
3135-0080-0098	3135	80	98	X2
3135-0198-0218	3135	198	218	X2
3135-0388-0408	3135	388	408	X2
3135-0748-0768	3135	748	768	X2
3135-0988-1008	3135	988	1008	X2
3135-1038-1058	3135	1038	1058	Fh
3135-1098-1118	3135	1098	1118	Fh

APPENDIX A

List of Rock Samples Selected for Static Testing (pre-2004 Database)

Sample ID	DDH	Start m	Finish m	Rock Type
3135-1238-1258	3135	1238	1258	Fh

Appendix B
List of Rock Samples Selected for Shake Flask Testing

APPENDIX B
List of Rock Samples Selected for Shake Flask Testing

Sample ID	DDH	Start m	Finish m	Rock Type
018-0135-0155	18	135	1055	D/D
027-0070-0090	27	70	90	Y
034-0060-0090	34	60	90	OB
041-0020-0040	41	20	40	Y
041-0244-0260	41	244	260	N
044-0225-0245	44	225	245	X.HGDN-YxN/D
044-0343-0363	44	343	363	Gp
044-0343-0363 (Duplicate)	44	343	363	Gp
047-0350-0365	47	350	365	Wy
068-0500-0520	68	500	520	G
071-0423-0443	71	423	443	R/Db
086-0000-0067	86	0	67	OB
093-0043-0063	93	43	63	G-p
093-0133-0148	93	133	148	G-p
114-0090-0104	114	90	104	Pp
115-0024-0034	115	24	34	TC- Arkose
2028-0155-0175	2028	155	175	Y
3079-0499-0519	3079	499	519	D
3080-0669-0689	3080	669	689	G^f
3087-0023-0040	3087	23	40	Y
3104-0378-0398	3104	378	398	Y
3105-0198-0208	3105	198	208	N
3113-0019-0037	3113	19	37	N / F.FD
3113-0157-0177	3113	157	177	N/F-D.Y
3114-0392-0410	3114	392	410	TC^k - Volc Cng
3124-0188-0209	3124	188	209	Y
3124-0188-0209 (Duplicate)	3124	188	209	Y
3128-0039-0056	3128	39	56	D
3129-0100-0119	3129	100	119	TC - And/Volc cng
3129-0253-0272	3129	253	272	TC - And/Volc cng
3135-0080-0098	3135	80	98	X2
3135-0388-0408	3135	388	408	X2
3135-0988-1008	3135	988	1008	X2
3135-1038-1058	3135	1038	1058	Fh
3135-1038-1058 (Duplicate)	3135	1038	1058	Fh

Appendix C
List of Rock Samples Selected for Humidity Cell Testing

APPENDIX C

List of Rock Samples Selected for Humidity Cell Testing

Age	Rock Type	Sample ID #	Selection (see Table 4)
Pre-Tertiary	Granodiorite-Quartz-Monzodiorite	046-0580-0600	1Ai
Pre-Tertiary	Monzodiorite	046-0113-0133	1Aii
Pre-Tertiary	Diorite/Gabbro	025-0617-0637	1Aiii
Pre-Tertiary	Monzonite (near Stock A)	118-0468-0488	2Ai
Pre-Tertiary	Monzodiorite	117-0190-0210	2Aii
Pre-Tertiary	Intrusion Breccia	112-0460-0480	2Aiii
Pre-Tertiary	Intrusion Breccia	3124-0872-0887	3Ai
Pre-Tertiary	Granodiorite-Quartz-Monzodiorite	3069-0927-0947	3Aii
Pre-Tertiary	Diorite/Gabbro	3123-0438-0458	3Aiii
Pre-Tertiary	Andesitic Bedded Rocks (Volcaniclastic Sandstone, Wacke)	019-0072-0090	1Bi
Pre-Tertiary	Andesitic Bedded Rocks (Argillite, Siltstone)	033-0137-0155	1Bii
Pre-Tertiary	Andesitic Bedded Rocks (Volcaniclastic Sandstone, Wacke)	047-0350-0365	1Biii
Pre-Tertiary	Andesitic Bedded Rocks (Volcaniclastic Sandstone, Wacke)	118-1220-1238	2Bii
Pre-Tertiary	Andesitic Bedded Rocks (Argillite, Siltstone)	118-0520-0535	2Biii
Pre-Tertiary	Andesitic Bedded Rocks (Argillite, Siltstone)	3115-0988-1008	3Bi
Pre-Tertiary	Andesitic Bedded Rocks (Argillite, Siltstone)	3124-0188-0209	3Bii
Pre-Tertiary	Andesitic Bedded Rocks (Argillite, Siltstone)	3102-0568-0588	3Biii
Tertiary	Sedimentary Units	115-0054-0066	
Tertiary	Sedimentary Units	115-0142-0163	
Tertiary	Volcano-Sedimentary Units	3129-0253-0272	
Tertiary	Volcano-Sedimentary Units	3129-0417-0435	
Tertiary	Intrusive Dykes	117-1055-1071	
Tertiary	Intrusive Dykes	3102-0958-0978	

Appendix D
List of Rock Samples Selected for Static Testing
(2004 Drilling)

Appendix D
List of Rock Samples Selected for Static Testing (2004 Drilling)

DDH	From m	To m	Rock Type
4173	0.00	30.48	OB
4173	48.46	50.29	TFf
4173	50.29	53.64	TA
4173	53.64	54.56	TA
4173	54.56	57.61	TA
4173	57.61	57.76	TA
4173	57.76	60.20	TA
4173	60.20	60.66	TF
4173	69.80	72.85	TF
4173	72.85	75.90	TC
4173	85.04	88.09	TW
4173	88.09	91.14	TW
4173	97.23	100.28	TW
4173	100.28	103.63	TW
4173	104.85	106.38	D
4173	106.38	109.42	D
4224	17.98	21.03	Y
4224	21.03	24.08	Y
4224	27.13	30.18	Y
4224	30.18	33.22	Y
4224	45.42	51.51	Y
4246	0.00	0.30	ob
4246	0.30	2.13	Y
4246	2.13	5.79	Y
4246	5.79	8.84	Y
4246	8.84	11.43	Gs?
4246	11.43	14.63	Gs?
4246	14.63	17.68	Gs?
4246	17.68	21.03	Y
4246	21.03	24.08	Y
4246	24.08	26.67	Y
4246	26.67	30.18	Y
4246	30.18	33.22	Y
4246	33.22	36.27	Y
4246	36.27	39.32	Y
4246	39.32	42.37	Y
4246	42.37	45.42	Y
4246	45.42	50.29	Y
4246	50.29	53.34	Y
4246	53.34	56.39	Y
4246	56.39	59.44	Y
4246	59.44	63.70	Y
4246	74.68	77.72	Y
4246	77.72	80.77	Y
4246	88.09	91.14	Y
4246	91.14	94.18	Y
4246	103.33	106.38	Y

Bold lines indicate compositing intervals

Appendix D

List of Rock Samples Selected for Static Testing (2004 Drilling)

DDH	From	To	Rock Type
4246	106.38	109.42	Y
4246	118.57	121.62	Y
4246	121.62	124.66	Y
4246	133.81	136.86	Y
4246	136.86	139.90	Y
4246	149.05	152.10	Y
4246	152.10	155.14	Y
4246	164.29	167.34	Y
4246	167.34	170.38	Y
4246	179.53	182.58	Y
4246	182.58	185.62	Y
4246	194.77	197.82	Y
4246	197.82	200.86	Y
4247	0.00	18.29	ob
4247	18.29	21.03	D
4247	21.03	24.08	D
4247	30.18	33.22	D
4247	33.22	36.27	D
4247	45.42	48.46	D
4247	48.46	51.51	D
4247	60.66	63.70	D
4247	63.70	66.75	D
4247	75.90	78.94	D
4247	78.94	81.99	D
4247	88.09	91.14	D
4247	91.14	94.18	D
4247	103.33	106.38	D
4247	106.38	109.42	D
4247	118.57	121.62	D
4247	121.62	124.66	D
4247	133.81	136.86	D
4247	136.86	139.60	D
4247	149.05	152.10	Y
4247	152.10	155.14	Y
4247	161.24	164.29	Y
4247	164.29	167.34	Y
4248	0.00	31.70	ob
4248	44.20	45.42	TBd-.MY
4248	45.42	48.46	TBd-.MY
4248	57.61	60.66	TBd-.MY
4248	60.66	63.70	TBd-.MY
4248	72.85	75.90	TBd-.MY
4248	75.90	78.94	TBd-.MY
4248	84.58	87.78	M.Y
4248	87.78	89.92	M.Y

Bold lines indicate compositing intervals

Appendix D
List of Rock Samples Selected for Static Testing (2004 Drilling)

DDH	From	To	Rock Type
4248	103.33	106.38	M.YM
4248	106.38	108.20	M.YM
4248	118.57	121.62	TBd
4248	121.62	124.66	TBd
4248	130.76	133.81	TBd
4248	133.81	136.86	TBd
4248	149.05	152.10	X.YM
4248	152.10	155.14	X.YM
4248	161.24	164.29	TBd.M
4248	164.29	167.34	TBd.M
4248	179.53	182.58	M.Y
4248	182.58	185.62	M.Y
4248	194.77	197.82	M.Y
4248	197.82	200.86	M.Y
4249	0.00	10.67	ob
4249	10.67	14.94	N
4249	14.94	17.98	N
4249	17.98	21.03	N
4249	21.03	24.08	N
4249	33.22	36.27	N
4249	36.27	39.32	N
4249	51.51	54.56	X.MD-YxN
4249	54.56	57.61	X.MD-YxN
4249	66.75	69.80	X.MD-YxN
4249	69.80	72.85	X.MD-YxN
4249	81.99	85.04	N
4249	85.04	88.09	N
4249	97.23	100.28	N
4249	100.28	103.33	N
4249	112.47	115.52	N
4249	115.52	118.57	N
4249	127.71	130.76	N
4249	130.76	133.81	N
4249	142.95	146.00	X.MDYxN
4249	146.00	147.52	X.MDYxN
4249	152.10	155.14	TA
4249	155.14	158.50	TA
4249	158.50	161.24	X.MDYxN
4249	161.24	164.29	X.MDYxN
4249	170.38	173.43	X.MDYxN
4249	173.43	176.48	X.MDYxN
4250	0.00	13.56	ob
4250	13.56	15.85	TC
4250	15.85	21.03	TW
4250	45.11	47.09	TF
4250	47.09	49.99	TC

Bold lines indicate compositing intervals

Appendix D

List of Rock Samples Selected for Static Testing (2004 Drilling)

DDH	From	To	Rock Type
4250	68.43	71.02	TW
4250	71.02	76.50	TY
4250	129.08	131.67	TW
4250	219.46	222.50	TC
4250	256.49	258.78	Gs
4250	258.78	261.82	Gs
4250	270.97	274.02	Gs
4250	274.02	277.06	Gs
4250	286.21	289.26	Y
4250	289.26	293.52	Y
4250	297.79	301.60	D
4250	301.60	304.19	Y
4251	0.00	57.76	ob
4251	75.90	78.64	TY
4251	145.39	148.13	TC
4251	182.73	185.32	TD
4251	213.36	215.80	Gs
4251	215.80	218.85	Gs
4251	243.23	246.28	Gs
4251	246.28	249.33	Gs
4251	273.71	276.76	Gs
4251	276.76	279.81	Gs
4251	304.19	307.24	Y
4251	307.24	310.29	Y
4251	333.45	337.72	Y
4251	337.72	340.77	Y
4251	365.15	368.20	Y
4251	368.20	371.25	Y
4251	396.09	398.68	Gs
4251	398.68	401.73	Gs
4251	426.11	429.16	Gs
4251	429.16	432.21	Gs
4251	456.59	459.64	Gs
4251	459.64	462.69	Gs
4251	487.07	490.12	Y
4251	490.12	493.17	Y
4251	517.55	520.60	Gs
4251	520.60	523.65	Gs
4251	548.03	551.08	Y
4251	551.08	554.13	Y
4251	578.51	581.56	Y
4251	581.56	584.61	Y
4251	605.94	608.99	Gs
4251	608.99	612.04	Gs
4272	0.00	33.53	ob

Bold lines indicate compositing intervals

Appendix D

List of Rock Samples Selected for Static Testing (2004 Drilling)

DDH	From	To	Rock Type
4272	33.53	36.27	X2.DYF
4272	36.27	39.32	X2.DYF
4272	45.42	48.46	X2.DYF
4272	48.46	51.51	X2.DYF
4272	60.66	63.70	X2.DYF
4272	63.70	66.75	X2.DYF
4272	75.90	78.94	X2.DYF
4272	78.94	82.30	X2.DYF
4272	91.14	94.18	X2.DYF
4272	94.18	97.23	X2.DYF
4272	106.38	109.42	X2.DYF
4272	109.42	112.47	X2.DYF
4272	121.62	124.66	X2.DYF
4272	124.66	127.71	X2.DYF
4272	136.86	139.90	X2.DYF
4272	139.90	142.95	X2.DYF
4272	152.10	155.14	X2.DYF
4272	155.14	158.19	X2.DYF
4272	167.34	170.38	X2.DYF
4272	170.38	173.43	X2.DYF
4272	182.58	185.62	X2.DYF
4272	185.62	188.67	X2.DYF
4293	0.00	53.64	ob
4293	53.64	56.69	TF
4293	112.47	114.91	TW/TY/TC
4293	200.56	203.61	TC
4293	247.50	249.63	Gs
4293	249.63	252.68	Gs
4293	277.06	280.11	Gs
4293	280.11	283.16	Gs
4293	307.54	310.59	Gs
4293	310.59	313.64	Gs
4293	334.98	337.57	Gs
4293	337.57	341.68	Z.Gs
4293	341.68	347.47	TBd
4293	372.31	374.60	Z.Y
4293	374.60	377.65	Gs
4293	402.03	405.08	Gs
4293	405.08	408.13	Gs
4293	429.46	432.51	Gs
4293	432.51	434.95	Gs
4293	462.99	466.04	Y
4293	466.04	469.09	Y
4293	493.47	496.52	Y
4293	496.52	499.57	Y
4293	520.90	523.95	Y
4293	523.95	527.00	Y
4293	549.86	551.38	D

Bold lines indicate compositing intervals

Appendix D
List of Rock Samples Selected for Static Testing (2004 Drilling)

DDH	From	To	Rock Type
4293	551.38	554.43	D
4293	578.82	581.86	Y
4293	581.86	584.91	Y
4293	609.30	612.34	Y
4293	612.34	615.39	Y
4293	639.78	642.82	D
4293	642.82	645.87	D
4293	670.26	673.30	D
4293	673.30	676.35	D
4293	700.74	703.78	D
4293	703.78	706.83	D

Bold lines indicate compositing intervals