APPENDIX N5.2

QUARRY Q11

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Baffinland Iron Mines Corporation
Mary River Project

Quarry Management Plan, Tote Road Quarry (Q11)

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Date	**Rev.**	**Status**	**Prepared By**	**Checked By**	**Approved By**	**Approved By**

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1. Introduction

The Mary River Iron Ore Project (the Project) requires site infrastructure development as part of the construction phase of the Project. To satisfy the need for aggregate resources for the development of this infrastructure during construction, quarries will have to be established and operated on-site. This document outlines the site description, operations and reclamation for Quarry Q11 along the Tote Road.

1.1 Regulatory Context

The guidelines provided by the Nunavut Impact Review Board (NIRB) and Aboriginal Affairs and Northern Development Canada (AANDC) (formerly Indian and Northern Affairs Canada) with regards to a Quarrying Permit Application state:

A Quarry Operations Plan is required with (this) application and must be approved by a Land Use Inspector prior to approval and issuance of the quarry permits if:

1. The volume being applied for is greater than 1,000 m^3 and/or
2. The quarry site is being operated by multiple users.

The proposed Q11 quarry along the Tote Road will exceed the volume threshold of 1,000 m^3, and a therefore this Quarry Management Plan represents a Quarry Operations Plan developed in accordance with NIRB and AANDC guidelines. The Quarry Management Plan, Tote Road Quarry (Q11) should be used in conjunction with the Mary River Project Borrow Pit and Quarry Management Plan in addition to all other noted documents. The Quarry Management Plan, Tote Road Quarry (Q11) is intended to be approved under a quarry concession schedule that forms part of an existing commercial lease and new operating lease.

The Quarry Management Plan, Tote Road Quarry (Q11) is required under Section 1 and 19 of Schedule B of the Commercial Lease, No. Q13C301, agreed to between Baffinland Iron Mines Corporation (Baffinland) and the Qikiqtani Inuit Association (QIA) as well as a requirement under the Type A Water Licence 2AM-MRY1325 (Part D item 7) for the purposes of Construction activities. The Quarry Management Plan, Tote Road Quarry (Q11) has been developed in accordance with requirements of the NIRB Project Certificate No.005 Condition #30 - *The Proponent shall develop site-specific quarry operation and management plans in advance of the development of any potential quarry site or borrow pit.* In the event the Project does not advance, the quarry will be subject to reclamation, as per relevant regulatory and permit obligations.

1.2 Site Description

The extent of Quarry (Q11) falls within the existing Quarry Concession Agreement under Qikiqtani Inuit Association Commercial Lease Q13C301. A more detailed plan of the extent of the quarry concession boundaries as well as the maximum extent of planned quarry development is shown in Drawing H349000-3138-10-015-0002 (Appendix A). The basic quarry specifications are shown in Table 1 below:

Table 1: Mary River Project Quarry (Q11) Specifications

Requirement	Description
NTS Map Sheet (1:50,000)	• 37 G/2 Edition 1 ASE Series A 713
Quarry vertices Coordinates (UTM)	• Centre Point N 7 962 744, E 516 585 • Western Extent N 7 962 848, E 516 410 • Eastern Extent N 7 962 658, E 516 727 • Southern Extent N 7 962 544, E 516 632 • Northern Extent N 7 962 922, E 516 543
Total Area of Quarry	• 50,433 m^2 (~5 ha)
Volume with Contingency **	• 175,000 m^3
Area of Existing Clearing	• No clearing is required as site is primarily exposed rock
Area of Proposed Quarrying	• Appendix A shows the quarry extents
Topsoil/Overburden Storage Area	• If required, any overburden or topsoil will be stockpiled and used for future reclamation purposes.
Access Roads/Trails	• No access roads required. Access will be directly from the Tote Road
Camp Locations	• No camp will be built specifically for the quarry operation. Personnel will be housed at the existing Milne Inlet Camp

Note: ** This is the anticipated quantity required, for more accurate quantities see the quarry section of the Annual Work Plan.

Topography varies considerably across the Project area. Milne Inlet is situated on a relatively broad, deep and flat sand beach and is closed in by steep fjord walls measuring approximately 60 – 600m above sea level. The Milne Inlet Tote Road follows Phillips Creek Valley, which starts near sea level at Milne Inlet and rises to an elevation of 188m above sea level (asl) at the Mine Site. The valley is confined by hills or mountains on both sides. The land to the west of the Project area is equally mountainous with some minor glacial coverage. There are several elevated plateaus to the east of the Project area formed by horizontal sedimentary deposits. Valley walls are generally steep and abrupt, often with distinct terraces.

Near surface bedrock is dominant in the quarry area. Limited overburden is in the form of localized deposits of till. The majority of the overburden is located in depressions between the numerous bedrock outcrops and is typically overlain by a layer of vegetation and boulders. This is evident along the base of the rocky outcrops at the quarry site. This is evident along the base of the rocky outcrops at the proposed quarry site (Refer to Figure 1)

The Project is located in a zone of continuous permafrost. The active layer through the Project area typically ranges from approximately 1 m to 2 m but may be greater in areas where there is loose, sandy soil at the edges of lakes or ponds and less in areas with a substantial surface layer of wet organic material. The proposed quarry site has areas where permafrost would be encountered. These are primarily in the deposition areas and deposits to the south of the actual site. Permafrost can range up to 30 m in depth with ice rich deposits

1.2.1 Environmental Setting

Surficial deposits along the Tote Road Alignment include till veneer or blankets on the higher elevations with some drumlins and moraines. Glaciofluvial outwash sediments (gravel and sand) forming braided floodplains, terraces and fans or stratified glacial drift are typically found in the valley floors. . Limited bedrock exposure is present along the Tote Road. The majority of the overburden deposition is located in depressions between bedrock outcrops and is typically overlain by a layer of vegetation and boulders. This is evident along the base of the rocky outcrops at the quarry site. The soils in the area are often covered by a thin layer of organics at the ground surface, creating a productive growing zone of topsoil for local vegetation.

Water crossings between km 15 and km 50 along the Tote Road range from extra-small to extra-large, most of which are in relatively close proximity to Phillips Creek and drain flatter terrain than those along the previous 14 km of the road alignment. As a result, smaller substrate sizes (e.g., gravel) are more prevalent. Stream morphology is characterized by a greater abundance of riffle/pool habitat, and natural water velocities are typically less than 1.0 m/s. There are limited barriers to fish movement and barrier types are more variable in this area compared to other project areas. Falls and steep gradients occur in some drainages, but others are simply disconnected from Phillips Creek due to insufficient flows. Arctic char were captured at crossings between km 15 and km 50 along the Tote Road. Streams in this area support a variety of juvenile Arctic char size classes. A single ninespine stickleback was captured during summer 2010, representing the only evidence of this species presence in watercourses in the Phillips Creek and Milne Inlet catchments. Overall population sizes of ninespine stickleback may be lower in these drainages compared with those further to the south or surveyed habitat is less suitable for this species. Monitoring points will be established in the drainages downstream of the quarry and upstream of any fish bearing streams (see Quarry Drainage Drawing Appendix A).

Figure 1: Milne Inlet Tote Road Quarry Q11

Vegetation within the Mary River Project area is described in the Vegetation Baseline Study Report in Volume 6 of the Final Environmental Impact Statement (FEIS) (Appendix 6C). No plant species considered to be “rare” in Canada were found to occur in any survey location. Vegetation is extremely limited in the area of the proposed quarry, and exists in small patches where organic deposits occur around the base of the rock outcroppings, and in the valleys in between large boulders.

Several species of songbirds and shorebirds migrate to this area annually to breed, and were predominately found in the various types of lowland habitats (river deltas, coastal plains, tundra, and near wetlands) that offer an abundant source of insects and vegetation for foraging and nesting habitat. The Milne Inlet Tote Road is bound by steep cliffs on both sides for much of its length and provides an abundance of high quality cliff nesting habitat, however no active Peregrine Falcon nests have been identified along the Tote Road. Terrestrial wildlife on north Baffin Island is described in the terrestrial wildlife baseline report (FEIS Volume 6: Terrestrial, Appendix 6F). Terrestrial wildlife includes, but is not limited to, caribou, wolves, foxes, arctic hares, ermine, and small mammals. Occurrence of most wildlife species on north Baffin Island is relatively sparse, and this is expected to be especially true at the quarry site given the type of terrain.

Marine mammals are not present in the area as the quarry site is located inland from Milne Inlet. No settlements or known hunting camps or areas are located in proximity to the proposed quarry site.

2. Environmental Responsibilities

2.1 Roles and Responsibilities

The Baffinland environmental team is organised into two parts, on site as well as off site. The organisational structure for the Mary River Project in relation to the environment discipline is shown in the Table 2 below. Communication channels are described as liaisons in the tables outlining the responsibilities and accountabilities in the following sections.

2.1.1 Environmental Project Team

2.1.1.1 The Baffinland Environmental Team

The Baffinland Environmental Team will oversee all environmental and community works on and off-site. The Baffinland Corporate Environmental Team responsibilities are summarized in Table 2.

Table 2: Baffinland Iron Mines Corporation Senior Management

Baffinland Iron Mines Corporation Senior Management	
Position	**Responsibilities and Accountabilities**
Project Director	- Reports to Baffinland's CEO - Overall accountability for the Project execution - Allocation of resources (human and financial) for the implementation of Baffinland's commitments and objectives related to health, safety and environment during construction of the Project - Accountable for on-site environmental, health and safety performance during construction of the Project
VP Operations	- Reports to Baffinland's CEO - Overall accountability for the operation of the Project - Allocation of resources (human and financial) for the implementation of Baffinland's commitments and objectives related to health, safety and environment during operation - Accountable for on-site environmental, health and safety performance during operation
VP Sustainable Development, Health, Safety and Environment	- Reports to Baffinland's CEO - Establish corporate environmental policies and objectives - Monitors and reports on Baffinland's performance related to environmental, health and safety policies and objectives - Community liaison - Liaise with regulatory authorities - Obtains necessary permits and authorizations - Monitors compliance with terms and conditions of permits and licences - Routine EHS audit of contractor performance while on site
Manager Purchasing and Contract	- Reports to Baffinland's Project Director - Accountable for procurement and purchasing - Ensure that environmental commitments, policies and objectives are included in all contract documents
VP Corporate Affairs	- Reports to Baffinland's CEO - Accountable for external communication (Governments, media, NGO, others) related to Baffinland's press release and overall communication of site incidents/events

The Baffinland Environmental Team will oversee all environmental activities on-site. These responsibilities on site are outlined in Table 3.

Table 3: Baffinland Iron Mines Corporation On-Site Management Team

Baffinland Iron Mines Corporation On-Site Management Team	
Position	**Responsibilities and Accountabilities**
Environmental Manager	- Reports to VP Sustainable Development, Health, Safety and Environment - Liaises with the Project Director, Construction Manager and the Emergency Response Team - Monitors environmental performance of contractors on site - Monitors compliance with permits, licenses and authorizations - Regulatory environmental monitoring and reporting (monthly, annual) - Routine audit of contractor's environmental performance on-site - Initiate/supervise environmental studies - Investigate and reports on accidents and incidents when they occur - Review and update environmental management plans
Environmental Coordinators/Superintendent	- Reports to Environmental Manager - Specific accountabilities for environmental monitoring and reporting - Provides induction and environmental awareness training to new employees and contract workers
Environmental Support Groups	- Reports to the Environmental Manager - Environmental database management - Various sampling, monitoring and reporting activities as required by permits, licenses and environmental management plans - Prepare updates to environmental protection plan and management plans
Environmental Monitors	- Reports to the Environmental Manager - Conduct monitoring activities as per the Environmental Management Plans
QIA Monitors	- Various monitoring and follow up activities - Roles will be defined in the IIBA agreement

2.1.2 Mary River Project Organizational Chart

For further information regarding the Mary River Projects organizational structure in relation to the environmental discipline, please refer to the Figure 2 below:

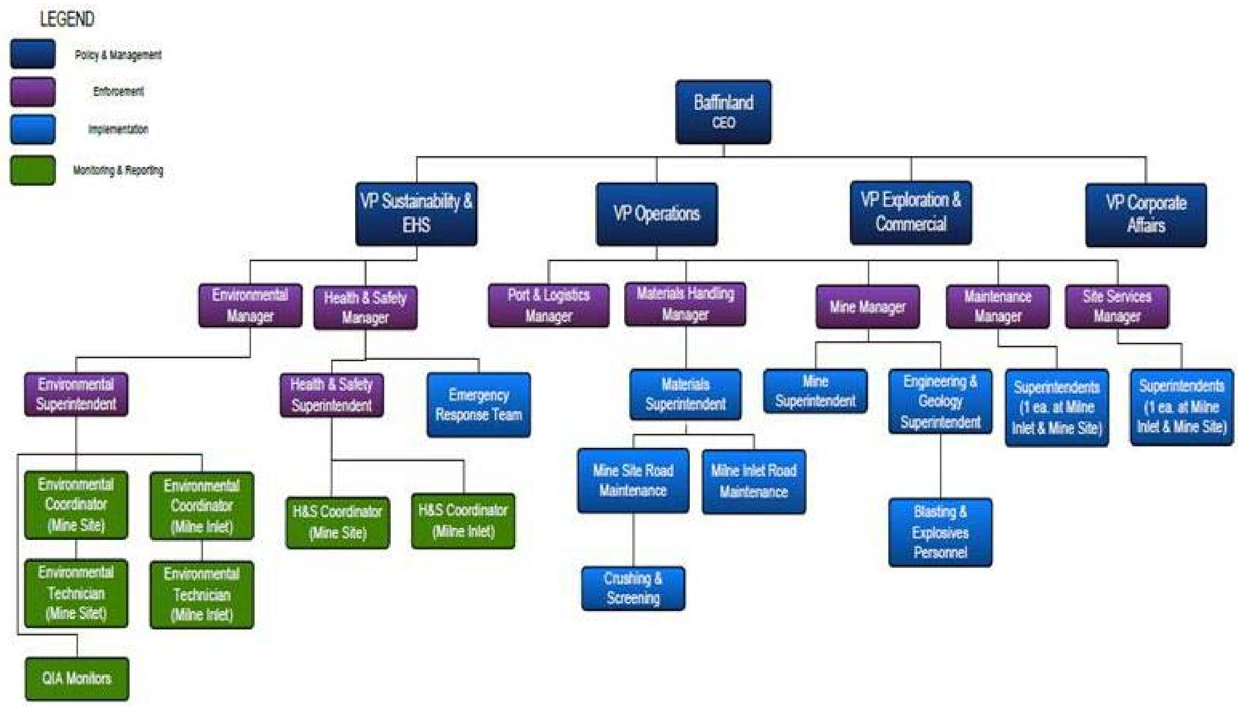


Figure 2: Mary River Organizational Chart

2.2 Quarry Development and Operation

The quarry will be accessed by a temporary road from the main staging area road. The temporary road will be constructed of granular material. Equipment transported to the quarry site will include:

- Crushing and screening (present at Mary River).
- Drilling Equipment.
- Rock hauling trucks.
- Excavators.
- Blasting equipment.

2.3 Quarry Development

The following steps provide a description of how quarry development will proceed and provide details of the different quarry activities associated with development.

1. Crusher Pad: Construct a small crusher pad near the Tote Road using fill material from a previously developed borrow/quarry site. The crusher pad will subsequently be expanded to the appropriate size for crushing and screening operations, stockpiles of crushed product, and loading operations to deliver produced rock materials.

2. Access Road: Construct a short access road with culvert water crossings and sediment and erosion controls from the crusher pad to the quarry face using fill material from a previously developed borrow/quarry site. This access road is used to transport the blasted quarry rock to the crusher pad.
3. Overburden: Clear and stockpile any overburden and soil adjacent to the quarry area for potential future use during reclamation of the quarry.
4. Pioneer Bench and Loading Pad: Using a pioneer track drill, the first bench is drilled and blasted at a higher elevation so the bench bottom elevation is similar to the desired loading pad elevation. A portion of the initial blasted quarry rock will be utilized at the quarry face to create a level pad for loading quarry rock into haul trucks. After the loading pad is finished, blasted quarry rock is hauled to the crushing pad for expansion of the crusher pad and as crusher feed material to produce aggregate.
5. Bench Drilling: As each drill round is blasted out, the drill will either stay at the current elevation to expand the bench in a longitudinal direction along the face, or proceed to a higher elevation to drill and blast higher elevation benches. These benches are expanded in length as required for subsequent blasting of rock at each bench elevation. Benches are developed for safety purposes and for efficient drill/blast operations.
6. Subsequent Bench Development: Additional benches are created at higher elevations to the preceding bench, starting at the open face of the site. Each bench is developed toward the main body of rock at that elevation. Lower elevation benches follow behind upper elevation benches and are drilled and blasted to move toward the main body of rock. Blasted material is excavated from bench areas and loaded onto trucks for delivery to the crusher. Ramps may be constructed to higher elevation benches for truck loading.
7. Drilling Quarry Rock: Drilling of the quarry rock is normally completed with the use of one drill rig. The boreholes are laid out by a surveyor to the engineered spacing and burden for each particular rock type, geology, and desired product size. The drill is removed from the area prior to the loading of explosives and blasting. The drill can proceed along the bench to continue drilling or move to a new bench.
8. Blasting Operations: Blasting rock is completed by installing high explosive detonating boosters with initiation wires. This is followed by loading each hole with either pre-packaged sticks of explosives, pre-packaged bags of explosives, or by pumping bulk emulsion from a bulk emulsion truck into the boreholes. Detonation and initiation is carried out with the use of delays to time the detonators in a sequence of smaller blasts for efficient rock breakage. Blasting lags behind the drill as more drilling is completed. As each new drill round is completed, the drill moves on and the drilled round is loaded with explosives and blasted.
9. Hauling Quarry Rock: The blasted rock is loaded onto trucks for delivery to the crusher.

10. Crushing Operations: Quarried rock is fed to the crusher and screening equipment to produce the desired rock product. The crushed and/or screened product is then stored in stockpiles and loaded into trucks for delivery to construction sites.

2.4 Quarrying Activities

The following provides detailed description of the general activities associated with quarrying:

2.4.1 Explosives Management and Blasting

A Blasting Management Framework has been developed and is presented in Annex 3 of the Borrow Pit and Quarry Management Plan. A detailed Blasting Operations Management Plan, incorporating the key items in the Blasting Management Framework has been prepared and is provided in Appendix B of this document.

Eventually Baffinland Iron Mines be using Ammonium Nitrate Emulsion (ANE). However explosives for the initial development of Quarry Q11 will also consist of pre-packaged explosives. Pre-packaged explosives will gradually be replaced by emulsion mixtures once the emulsion plant is erected and made operational during 2014. Transportation of explosives to and from the quarry site will occur from the temporary magazine storage area via road.

Blast hole drilling will take place on an appropriate grid pattern, determined by field testing, in an effort to optimize blast rock size and blasting efficiency. Blasting will normally take place at the beginning and end of each shift on a seven days per week basis. An Explosives Management Plan (28 August 2013) for the Project has been developed by the contractor and provided to the NWB on September 9th 2013.

2.4.2 Excavation and Crushing

The entire operation takes place in an area of permafrost, and groundwater is therefore not an issue. Drilling will be monitored to avoid creating runoff, erosion and drainage issues. Washing of aggregate is not required, as the material will be primarily used for site preparation.

Some minor organic surface soils are present in the quarry area. If these overburden soils cannot be avoided, then they will be stripped and stored separately at the storage area for later re-use. Quarrying will work along the exposed rock faces and will be terraced to minimize run off from the site. Efforts will be made during blasting operations to avoid creating depressions which might collect run off or melt waters. Drilling and extraction exercises may occur concurrently, depending on issues of safety and schedule. Blasted rock will be cleared by loader and/or scraper and put into rock trucks for transport to the crusher/screener facility. Loaders will feed rock to the crushing and screening operation.

Crushing and stockpiling areas will be located as near as practical to the southern extent of the quarry within easy access to the road.

Crushing operations and screening operations will take place during the day shift, seven days per week. The operation will process rock from the quarry, and may also process rock from other areas if required. Final material will be stored by aggregate size in stockpiles for transport to the appropriate construction sites.

2.4.3 Site Security and Safety

Copies of all safety and management documents will be made available to on site personnel and mandatory training for operations at the Quarry (Q11) will take place. The Area Coordinator will ensure that operations are consistent with other management plans, terms and conditions of the issued permits and safety procedures for the Project.

Security signage will be posted at the entrance to the quarry. The remoteness of the quarry and the onsite presence of operations personnel will make perimeter fencing unnecessary. Audible warning systems will be employed for all blasting operations at posted intervals prior to any detonations.

Blasting and processing operations will be suspended if incursions into the quarry occur, or if observations of wildlife in the immediate quarry area are made.

2.5 Site Management Measures

Best management practices for quarry operations will be followed for Quarry (Q11). The following management activities will be incorporated into the site operations:

2.5.1 Assessment for Acid Rock Drainage (ARD)

In 2010, AMEC undertook an assessment to identify potential sources of construction aggregate along the existing Tote Road from Mary River to Milne Inlet. There were a total of twenty potential quarry sites identified and seven of these were located within the Milne Inlet Borrow Area. Included in these seven quarries were the Milne Inlet Quarry Q1, Quarry Q7 and Quarry Q11. The bedrock ridge identified within the Milne Inlet Borrow area extends further south to approximately mile marker 31km on the Tote Road. The principal rock type in this ridge is granitic gneiss which is fresh, hard and highly fractured. The high degree of fracturing in the bedrock is consistent with the close proximity of the ridge to a major shear zone immediately to the west. This bedrock ridge holds a good potential for development of high quality construction aggregate.

The Milne Inlet Quarry (Q1) has been assessed utilizing the Protocol for the Assessment for the Potential for Acid Rock Drainage (Borrow Pit and Quarry Management Plan, Annex 2). From the start of quarrying operations in the summer of 2013 composite samples of quarried material from Q1 were collect every 10,000m^3 and assessed for metal leaching and acid rock drainage (ML/ARD). The results from these analyses confirm the 2010 AMEC Assessment Report that the rock has negligible ML/ARD potential. The results of these studies can be found in Appendix C and D of this document.

Since all quarries are found within the Milne Inlet Borrow Area, the rock type in quarry Q7 and Q11 is confirmed as fresh granitic gneiss, which is the same as the rock type of quarry Q1, the rock at Q7 and Q11 may be considered suitable for quarrying.

2.5.1.1 ML/ARD Sampling Results for Q1

A review was conducted of existing site information and a visual inspection of surface portions of the proposed quarry development area was undertaken by means of a walk around. The review indicated that the principal rock type of quarry and surrounding areas is granitic gneisses. The gneisses are heterogeneous commonly with inclusions and bands of mafic, metasedimentary and other granitic rocks. Visual observations of the quarry development area indicated that outcrop exposure was excellent with little soil covering. Trace to no sulphides was observed during the site visit and there were no surface areas of visible sulphide oxidation.

2.5.1.2 Sampling

During 2013, composite samples of quarried material representative of a blast (crusher quarry runs) were collected for every 10,000 m^3 of material quarried of the Q1 quarry. The analytical methods adopted are consistent with the predictive sampling MEND 2009 (Prediction Manual for Drainage Chemistry from Sulphidic Geologic Materials (MEND, 2009). Between June 9th and August 26th 2013, approximately 120, 000 m^3 of quarried rock was sampled and a total of 12 composite samples collected and tested. Each composite sample consisted of eight discrete samples.

The ML/ARD results of these samples are presented below and are consistent with 2010 AMEC Report samples from borehole (BH10-04).

2.5.1.3 Analytical Testing Methods

Analytical tests included the following:

- 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.

2.5.1.4 Results

The results of the above analyses for quarried rock samples indicate that the bedrock gneiss underlying the Milne Inlet (Q1) quarry development area exhibit the following range characteristics:

- Paste pH is alkaline (7.71 to 9.95).
- Sulphide content was less than 0.01% for all samples.
- The range of Neutralization Potential Ratios (NPR) well in excess of 3 indicating non-potentially acid generating.
- Neutralization potential (NP) values ranged from 4.1 to 216.
- In a comparison of concentration of total metals of concern results of samples to crustal abundances, no notable elevation of metals were noted.

2.5.1.5 *Key conclusions and recommendations*

- Based on the results of geochemical and mineralogical analyses and general surface and subsurface geological observations there is a low potential for ML/ARD and the materials are considered to be a suitable quarry source.
- Based on the work to date, both locally and regionally, in other areas of gneiss that have been investigated along the Tote Road, there is no evidence of elevated sulphide.

2.5.1.6 *ML/ARD Sampling Protocol for Q7 and Q11*

To comply with commitments, an operational testing program is recommended during the quarry extraction process at quarries Q7 and Q11, in alignment with the program completed at Q1. As what was done with Quarry Q1 during 2013, one composite sample of quarried material representative of a blast (muck sample or blast hole cuttings) will be collected for every 10,000 m^3 of material quarried. This frequency of sampling may be reduced in the future if justified by results and approved by the Board. The analytical methods to be adopted will be as for the predictive sampling (MEND, 2009) or a defined alternative that has been shown to be predictive of ARD/ML. The quarried material will also be visually inspected for the presence of sulphides. The sampling and analytical testing methods will be the same as Q1.

2.5.1.7 *Future reporting*

Operational testing results will be included in the annual reporting for the project.

2.5.2 *Blasting Operational Management*

A Blasting Management Framework has been developed and is presented in Annex 3 of the Borrow Pit and Quarry Management Plan. A detailed Quarry Blasting Operations Management Plan, incorporating the key items in the Blasting Management Framework as well as general procedures to be used for blasting has been prepared by BIM and is found in Appendix B of this document.

2.5.3 *Drainage Management*

The potential exists to alter drainage patterns of overland flow paths and to cause minor affect on local water quality. The hydrological regime around the quarry site will need to be maintained and appropriate direction of flows from site managed to maintain the natural flow patterns to the greatest extent practical. Where required, upstream runoff will be diverted to maintain water quality and minimize contact with quarry operations. Poorly developed overland flow paths that intersect with the quarry development area will be modified as required to accommodate flows around the quarry development. This can be accomplished by means of diversion berms or excavation of shallow ditches.

There will only be a discontinuous discharge from quarries, water runoff from quarries will be managed. As required, the quarry runoff collection locations will change over time. The drainage plans showing interpreted flow paths and downstream receivers for Quarry Q11 are presented in Appendix A.

Sources of contamination from the operation that could affect water quality include blasting residues from blasting and spills from refuelling of equipment. Blasting residue from explosives will be managed by following best practices to ensure that blasting efficiencies are optimized resulting in the ignition of blast material. Vehicle re-fuelling will be conducted at a centralized fuelling facility off site that has proper containment and spill response capability. Re-fuelling of stationary onsite equipment, such as generators, will take place in a secured area with approved spill containment. Spill kits will be strategically located at the Q11 quarry site.

2.5.4 Dust Management

The primary sources of dust at the Quarry (Q11) are blasting, loading and crushing and screening of aggregates. Very little topsoil exists at the quarry site, and is not considered a primary source of dust. The management of dust will be accomplished by minimizing the creation of dust at source. Crushing locations will take into account proximity to surface waters or dust sensitive areas. If possible, protection from prevailing winds will be accomplished by situating the crushing operation to take advantage of the local topography for shelter. Transport of material will be subject to speed limit restrictions to help reduce dust.

2.5.5 Noise Management

Quarry activities will generate noise from equipment operation, blasting and crushing and screening operations. Noise receptors within the area are restricted to wildlife, as no dwellings or other land use that is sensitive to noise occur nearby.

During quarry operations, monitors will inform the quarry manager if significant wildlife activity, such as caribou movements, is occurring. Depending on the concentrations and likely effect of the noise generating activity, the quarry manager may temporarily suspend operations.

2.6 Monitoring

Operation of Quarry (Q11) must be monitored to ensure compliance with the Borrow Pit and Quarry Management Plan and to meet the terms and conditions of the regulations and land-use permits granted for the Project. Monitoring will focus on:

- Regular inspection of site-preparation measures.
- Regular monitoring of drainage from the quarry site.
- Volume and quality estimates of the granular resource material produced.
- Monitoring for ground-ice presence.
- Monitoring for presence of avian, terrestrial and marine mammals in the area.
- Monitoring of water quality for changes.
- Reporting requirements as outlined in any permits.

During periods of flow, turbidity/TSS and ammonia will be monitored in the field by means of field testing methods and meters that are based on approved methodologies. If field testing detects elevated Turbidity/TSS and/or ammonia in collected runoff at levels acutely toxic (assumed to be > 20 mg/L ammonia (as N), further downstream sampling will be conducted near the discharge location to potential fish habitat for the parameters of concern as well as for acute toxicity.

3. Supporting Management Plans

This plan should be viewed in concert with the following additional plans prepared for the pre-development works:

- Emergency Response & Spill Contingency Plan.
- Surface Water and Aquatic Ecosystems Management Plan.
- Explosives Management Plan.
- Waste Management Plan;
    - Acid Rock Drainage Testing Protocol (refer to Borrow Pit and Quarry Management Plan, Annex C)
    - Blasting Management Framework Protocol (refer to Borrow Pit and Quarry Management Plan, Annex B).
- Blasting Operations Management Plan (refer to Appendix B of this document).

4. Closure and Reclamation Activities

4.1 Closure of Active Quarry Face

The closure and reclamation of Q11 quarry will be integrated into the overall Project Abandonment and Reclamation Plan. However, separate closure plans for Mary River Mine Site Quarry and borrow pit operations are required. Closure of the active quarry face will involve removing all materials, equipment and infrastructure and performing reclamation activities on the site until all closure objectives, as defined in the Project Abandonment and Reclamation Plan, are met.

4.2 Waste Disposal

All site waste will be collected and placed in appropriate containers for removal. Pre and post waste removal inspections will be made to ensure the thoroughness of the program. Waste will include metallic waste, construction material waste and domestic waste.

At the current time, no washroom facilities for personnel are expected at the quarry site. Any requirement for such facilities will be met by easily removable portable toilets. These will be operated in a manner consistent with regulations, and disposal will be in accordance to the approved Mary River Waste Management Plan and Hazardous Material and Hazardous Waste Management Plan.

Explosive packaging, mainly cardboard boxes, will be open burnt on site at a dedicated location(s) near or within the quarry. Open burning procedures will be followed.

4.3 Stockpile Removal

Quarrying activities will be closely managed to avoid the accumulation of unnecessary stockpiles of aggregate. Any stockpiles that do remain will be dealt with as follows:

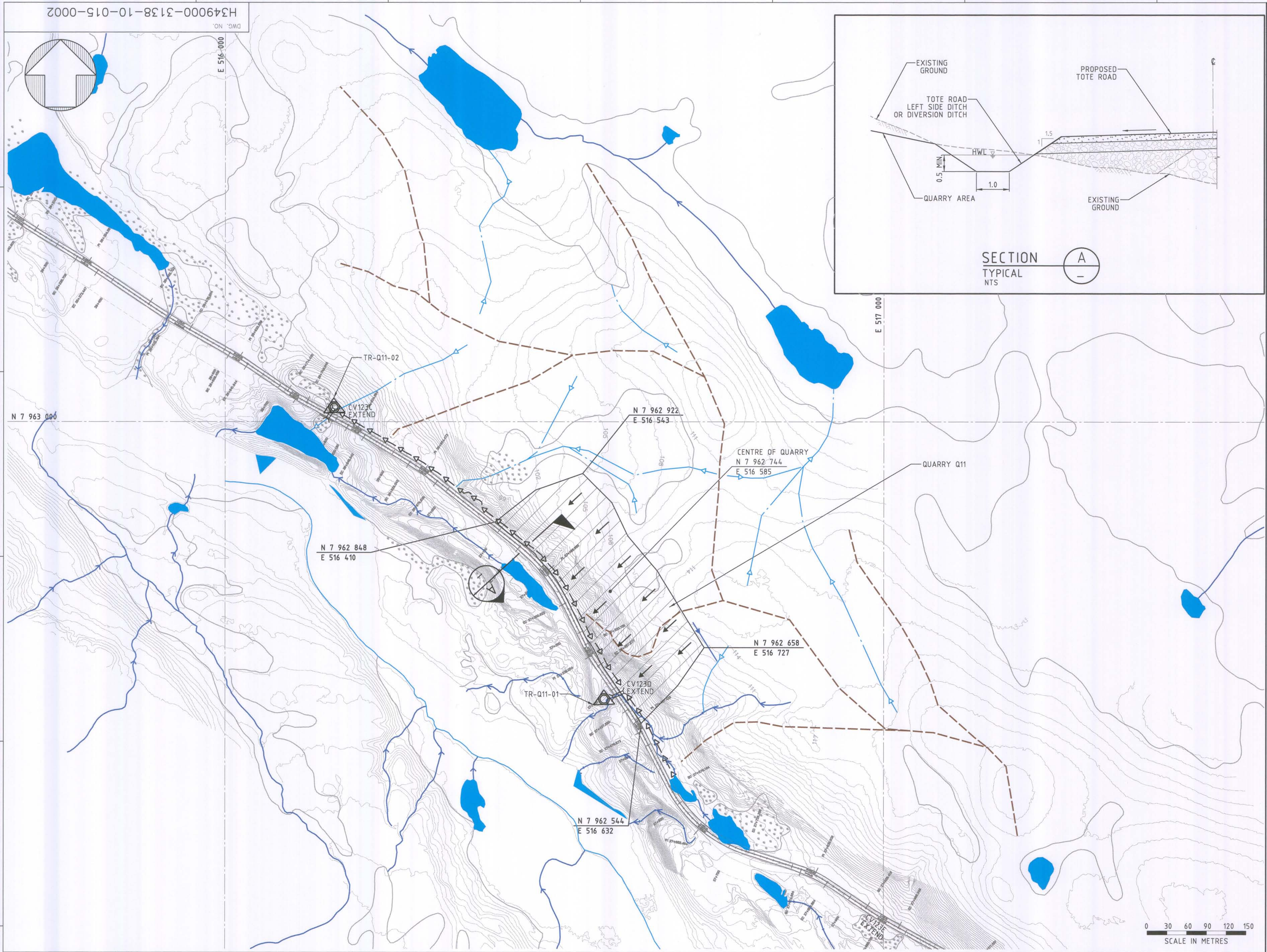
- Large rock will be spread out on the landscape or used as rip-rap for erosion control.
- Medium sized rock will be used to re-contour affected areas to re-establish a more natural appearance to the area.
- Small crushed rock will be used to assist in drainage restoration, and spread on the landscape to re-establish more natural contours.
- Any collected overburden and soils will be spread out over the quarry site to allow for the re-establishment of vegetation. No vegetation planting or seeding operations will take be undertaken to avoid introducing invasive species. Natural re-vegetation will be allowed to take place.

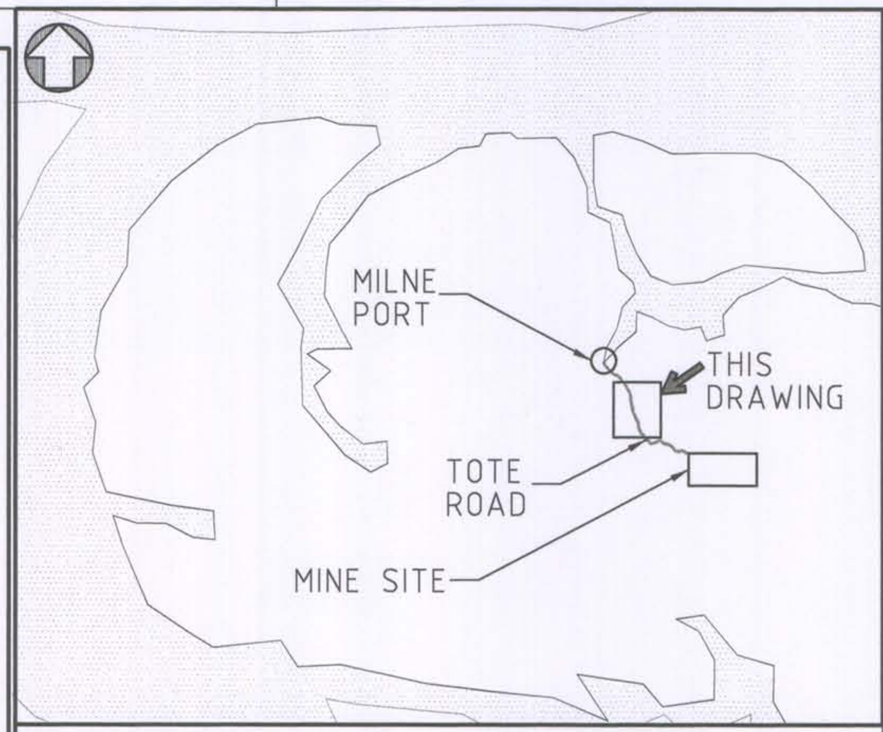
4.4 Soil Remediation for Contaminated Soils

A pre-closure inspection of the entire quarry site will be made. Any contaminated soils, snow or ice packs, or overburden will be flagged. The extent of the contamination will be determined, and the material removed. Hydrocarbon contaminated soils or overburden will be transported to the land farm to be established on site. Should a spill occur before the landfarm is ready, the contaminated soil would be placed within existing lined and bermed areas as is currently the practice under the existing Type B Water Licence. Other contamination will be managed in accordance with the approved Waste Management Plan and the Interim Mine Closure & Reclamation Plan H349000-1000-07-126-0012, June 7, 2013.

Appendix A

Q11 Drainage Drawing, H349000-3138-10-015-0002





KEY PLAN

LEGEND:

	EXISTING WATERBODY
	PROPOSED FOOTPRINT OF QUARRY AREA
	BAFFINLAND'S COMMERCIAL LEASE ON INUIT OWNED LAND
	EXISTING STREAM
	OVERLAND FLOW PATH
	EXISTING DRAINAGE TO BE DIVERTED/ABANDONED
	SURFACE DRAINAGE DIVERSION
	INTERNAL SURFACE DRAINAGE
	RIDGE LINE (HIGH POINT)
	PROPOSED CULVERT
	EXISTING CULVERT (LOCATION APPROXIMATE)
	WATER QUALITY MONITORING LOCATION (TR-Q11-01)
HWL	HIGH WATER LEVEL
	TOTE ROAD LEFT SIDE DITCH OR DIVERSION DITCH

NOTES:

1. TOPOGRAPHY PROVIDED BY TERRAPOINT CANADA INC.
2. COORDINATE GRID IS SHOWN IN UTM (NAD83) ZONE 17 AND IS IN METRES.
3. CONTOURS ARE IN METRES. CONTOUR INTERVAL IS 1.5 METRES.

FOR PERMITTING

DRAWING NO.	DRAWING TITLE
H349000-3000-10-012-0030	TOTE ROAD – STA. 27+450 TO 28+150 – PLAN AND PROFILE
H349000-3000-10-012-0029	TOTE ROAD – STA. 26+750 TO 27+450 – PLAN AND PROFILE
H349000-3000-10-012-0028	TOTE ROAD – STA. 26+050 TO 26+750 – PLAN AND PROFILE

REFERENCE DRAWINGS

PERMIT TO PRACTICE
HATCH LTD.
Signature [signature]
Date 17Oct13
PERMIT NUMBER: P 512
The Association of Professional Engineers, Geologists and Geophysicists of NWT/NU

NO.	DESCRIPTION	BY	CHK'D	APP'D	DATE

REVISIONS

REGISTERED PROFESSIONAL ENGINEER
M. M. S. HASSAN
LICENSEE
17Oct13
NT/NU

REV.	ISSUE FOR	AUTH. BY		DATE
0	FOR PERMITTING	SH	IK	2013-10-17

ISSUE AUTHORIZATION

HATCH™

DESIGNED BY I. KITYNSKA DATE 2013-10-11	DRAWN BY I. KITYNSKA DATE 2013-10-11
CHECKED BY K. FALLAHI DATE 2013-10-17	DISCIP. ENGR. S. HASSAN DATE 2013-10-17
PROJ. DES. COORD. T. THERTELL DATE 2013-10-17	PROJ. ENGR. J. CLELAND DATE 2013-10-17
PROJ. MGR. S. PERRY DATE 2013-10-17	

Baffinland

MARY RIVER PROJECT

TOTE ROAD
QUARRY Q11
DRAINAGE PLAN

SCALE 1:3000 OR AS NOTED

DWG. NO. H349000-3138-10-015-0002

REV. 0

ORIGINAL SHEET SIZE: ISO A1 (841 x 594)

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Appendix B

Blasting Operations Management Plan

Quarry Blasting Operations Management Plan

Baffinland Iron Mines Corporation

Mary River Project, NU

October
2013

Table of Contents

List of Tables

1. Purpose of Document

Baffinland Iron Mines Corporation (Baffinland) is committed to implementing best management practices in its use of explosives for quarrying activities at the Mary River Project. To this end, a Quarry Blasting Operations Management Plan has been developed which identifies site specific blasting operational management procedures to limit, control and mitigate the release of undetonated explosives from blasting operations at the quarry sites.

This document covers the site specific blasting operational management procedures to be adopted during quarrying activities, employee responsibilities, as well as mitigation measures and controls for all potential environmental concerns related to blasting and use of explosives. Baffinland will develop quarries in an environmentally acceptable manner that meets the requirements of all obtained permits and authorizations.

2. Environmental Management

2.1. Introduction

For the remainder of 2013 and in 2014, Baffinland will be using pre-packaged explosives for the quarry activities occurring associated with the Mary River Project. The pre-packaged explosives will be stored in sea-containers in secured locations near Mary River, Milne Inlet and along the Tote road that have been approved by the NWT/Nunavut Mines Inspector.

It is recognized that ammonium nitrate (AN) is a soluble inorganic nitrogen compound and that there is a risk that arises from aqueous dissolution which could potentially impact surface waters which may support aquatic life. However, pre-packaged explosives have a benefit, of just that being pre-packaged, so it does eliminate and minimize the release of ammonium nitrate to the environment.

In the future Baffinland's blasting contractor will be constructing an emulsion plant on site that will produce explosives locally for the operations phase of the project, but that facility will not be constructed until late 2014. As a requirement of Type A Water Licence 2AM-MRY1325, Baffinland will submit for approval an Operational Phase Blasting Operations Management Plan that will outline the steps and best management practices that will be implemented to minimize ammonia releases to the environment.

Due to potential environmental concerns related to the introduction of nitrogen compounds at the Mary River Project, operating procedures will implemented to limit, control and mitigate the release of AN from blasting operations. The following section provides details on the environmental controls and mitigation measures that will be employed for the quarrying activities during construction phases of the Project. It includes details on the environmental setbacks, archaeological sites, explosives use, spillage cleanup and containment, training, management of grubbing, till management, storm runoff and snow melts, water sampling, blasting near water and performance monitoring for the operation of quarries.

The information provided, herein, supplements that provided in the related documents:

- Borrow Pit and Quarry Management Plan
- Baffinland Iron Mines: Mary River Project - Explosives Management Plan Nunavut, Canada (August 29, 2013)

2.2. Setbacks

A minimum of thirty-one (31) metre undisturbed buffer zone will be established between the periphery of Quarry sites and the ordinary High Water Mark of any water body unless otherwise approved by the Board in writing. Buffers will be surveyed in before any construction or opening of the quarry can proceed.

2.3. Archaeological Sites

All identified archaeological sites in areas potentially impacted by quarry activities will be surveyed and if required, a buffer zone will be established around the archaeological site as required by the Government of Nunavut's Archaeological and Paleontological Sites Regulations and as recommended by the archaeologist. No construction is to take place within the buffer zone and no employees will be permitted to enter the site. If a relevant archaeological site is identified during the course of the operations, all work will cease and the archaeologist will be contacted and brought to the site. Work in the area would only proceed based on the recommendations of the archaeologist with input from the Government of Nunavut.

2.4. Explosives Usage, Spillage Cleanup and Containment

For the remainder of 2013 and during 2014, high quality pre-packaged will be used for the blasting operations in the quarries. The pre-packaged explosives utilize an optimally mixed hydrophobic emulsion compound that works to repel water and keep ammonium nitrate out of the surrounding ecosystem. Once again, the use of pre-packaged explosives for blasting in quarries will greatly minimize AN releases to the environment. It is however recognized that ammonium nitrate is highly soluble in water and is difficult to recover once it is in solution. The primary ecological concerns with ammonia include acute end-of-pipe toxicity and chronic toxicity downstream lakes. Ammonia nitrifies to nitrate which can be potentially toxic to aquatic life at elevated concentrations. Nitrate, in the presence of phosphorus, can contribute to the process of freshwater eutrophication. Therefore, best practices for efficient use, containment at source and rapid containment and cleanup of any spills is therefore the primary objective for the protection of aquatic life.

Proactively controlling the release of ammonia at point source has a positive net environmental effect versus managing ammonia after dissolution in water which is much more difficult. Industry best practices will be adopted to maximize source control and to minimize the potential for AN dissolution to downstream waters. The following point source protective measures will be taken:

- When handling, transporting or storing explosives, care will be taken to avoid any spillage. This is greatly reduced or eliminated with the use of pre-packaged explosives. However, if any spillage of product should occur, it will be promptly reported, cleaned up, and properly disposed in accordance to approved site waste management practices. A Spill Report detailing the incident will be submitted to the Baffinland Environment Department. A follow-up report will be provided that details basic cause of the spill and any corrective actions taken to minimize the type of incident from reoccurring.
- Prior to loading explosives, blast holes will be inspected for the presence of water. To limit explosives-water contact, areas that are subject to shallow groundwater flows are identified, and dewatered prior to blasting.
- Selecting, adopting, and manufacturing the optimum explosive mix types and loading procedures for site specific applications.
- Stand time for explosives will be minimized and the lag time between load and blast will be kept to a minimum.
- Holes will be loaded by experienced supervisors/blasters so that the blasting pattern optimizes complete detonation of explosives, and avoiding misfires which will also minimize the release of ammonia residue to the environment.
- If there is a miss hole/misfire resulting in incomplete detonation of explosives, the event will be reported to the Baffinland Mine Engineer and the Environmental Supervisor. If the residual blasted material in the vicinity of the miss hole represents

a potential source of nitrogen compounds, the Engineer will ensure that the material will be appropriately collected/stored and managed to the satisfaction of the Environmental Supervisor so as to minimize the potential for soluble nitrogen compounds from entering fish bearing waters.

- Upstream overland flows that impinge on quarry operations and have the potential to contaminate clean downstream water will be diverted around the active pit area by means of berms, check dams, or minor diversions. Based on the site drainage plan, the upstream flows from the quarry development area are anticipated to be minor.
- In the event that there is the potential for nitrogen compounds to adversely impact downstream fish bearing waters contingency actions will be taken that could include:
  - Storage of impacted water within the pit in constructed sumps.
  - Other treatment options such as the careful discharge to the tundra or where there is abundant surface vegetation (approval may be required) after meeting regulatory requirements for water quality.

2.5. Training

Training is seen as a key element in the safe usage and proper environmental management of explosives and blasting. All employees working on or around blasting operations will undergo rigorous employee orientation and training procedures for: managing, transporting and loading explosives into blast holes. Experienced competent employees are an essential part of blasting best management practices. On-site Environmental staff will regularly audit blasting quarry operations and if as required will conducted further information sessions with staff involved in blasting operations to instill to them the importance of point source control of ammonia to minimize impacts on the environment

2.6. Management of grubbing and disposal of related debris

The principle concerns associated with grubbing and disposal of related debris are:

- Potential effects on water quality caused by erosion and sedimentation;
- Disturbance of the permafrost leading to ground failure (slumping and erosion)

Baffinland is committed to meeting the regulations for maximum allowable concentrations of any grab sample of total suspended solids (TSS) of 100 mg/L and Maximum Average concentration of 50mg/L of Total Suspended solids as outlined in the Type A Water Licence 2AM-MRY1235).

All grubbing and disposal of related debris near watercourses will comply with approvals from respective regulators and the landlord. At a minimum measures to be undertaken to minimize effects on aquatic habitat and resources are as follows:

- Grubbing of the organic vegetation mat and/or the upper soil horizons will be minimized, and left in place where possible;
- If needed, the organic vegetation mat and upper soil horizon material, which has been grubbed, will be spread in a manner that attempts to cover exposed areas. Any surplus of such material will be stored or stockpiled for site rehabilitation and re-vegetation purposes elsewhere in the project area. Topsoil will be stockpiled separately from the overburden. The location of the stockpiles will be recorded and accessible for future rehabilitation purposes;
- During grubbing, care will be taken to ensure that grubbed material will not be pushed into areas which are to be left undisturbed.

2.7. Till Management

Till stripped from the quarries (if required) will be placed in an area approved by the onsite environmental personnel. These areas can be an area currently identified for till/topsoil storage area or an area close to a quarry that is unlikely to erode into any water bodies during spring thaw.

Till can be used for building a berm around quarry as a means to prevent runoffs and snow melts into nearby natural drainage systems. If seepage through a berm wall is occurring, sediment control mats or silt fences will be laid at the foot of the berm wall to minimize transportation of fines into water courses.

2.8. Storm Runoff and Snow Melts

The final quarry configuration will consist of a flat surface graded at approximately 1% in the down slope direction, adjoining a steeper angle rock surface that forms the transition to natural ground on the ridge above. Storm and snow melts water will be diverted away from the quarry by a small 0.5 m berm on the upslope edges of the excavation. All runoff and snow melts will be contained in a lined designated location within the quarry.

2.9. Water Sampling

Water sampling will be conducted at locations and frequency specified by the Baffinland Environmental Supervisor. Water sampling locations will be based on the location of quarry operations, site drainage configuration (refer to site drainage plan), and seasonality. The sampling will be undertaken by the onsite environmental personnel.

2.10. Blasting Near Water

Most if not all of the quarries being excavated are not very near any water. However, particular care must be taken if blasting is undertaken near water bodies. This includes proper explosives handling, selection of the correct explosive (see: Section 2.3), and utilization of best management practices. All quarry blasting on the Mary River Project will adhere to the Department of Fisheries and Oceans (DFO) "Guidelines for the Use of Explosives In or Near Canadian Fisheries Waters"[1] (as per Project Certificate 005 condition no. 44 and 48).

Project Certificate Condition #44 – "The proponent shall meet or exceed the guidelines set by Fisheries and Oceans Canada for blasting thresholds and implement practical and effective measures to ensure that residue and by-products of blasting do not negatively affect fish and fish habitat."

Project Certificate Conditions #48 – 'The Proponent shall engage with Fishereis and oceans Canada and the Qikiqtani Inuit Association in exploring possible Project specific

[1] Wright and Hopky 1998, Guidelines for the use of Explosives In or Near Canadian Fisheries Waters

thresholds for blasting that would exceed the requirements of Fisheries and Oceans Canada's Guidelines for the Use of Explosives In or Near Canadian Fisheries Waters (D.G. Wright and G.E. Hopky, 1998)."

2.11. Environmental Monitoring

An environmental performance monitoring program will be implemented to ensure that AN release to receiving waters from AN explosives is minimized and remains within regulatory limits stated in Baffinland's Type A Water Licence (2AM-MRY1325). These targets and methods to monitor performance will be developed during quarry start up. Initially, the following types of monitoring procedures are anticipated:

- Procedure for blast performance monitoring to optimize blasting efficiency and to minimize the potential for unexploded product.
- Procedure for monitoring and auditing of field operations related to explosive storage, handling, any spillages and blast hole loading.
- Procedure for auditing and assessing individual employee environmental awareness and effectiveness of training with regard to blasting operations and the procedures related to environmental management.
- Ammonia and nitrate monitoring of surface water flows to fish bearing waters at identified water monitoring points, as per the drainage drawing.

In the event that performance monitoring indicates that targets are not being met, corrective actions will be taken to improve performance and contingency measures will be taken to prevent the discharge of ammonia exceedances to the aquatic receiving environment.

3. Blast Pattern Design

3.1. Objective

To provide the engineering department with a safe procedure for designing blasting patterns.

3.2. Introduction

This procedure was developed to ensure that the engineering department, including any sub-contractors, are aware of their safety responsibilities while designing and staking blast patterns at the quarries being developed at the Mary River Project.

3.3. Definitions

- None

3.4. Tasks

Table a: Requirements and Responsibilities for Blast Pattern Design

Task	Person Responsible
All borehole locations designed by engineering are to be placed at a distance of one meter or greater from any bootleg locations	Site Engineer
If any holes designed by engineering cannot be drilled in the design location due to ground conditions, then a new location can be used only if it is picked up by survey and found to be one meter or further away from any bootleg locations	Surveyor / Mine Engineer
No holes are to be designed in a location within five meters of a misfired hole	Mine Engineer
Prior to firing any blast, all borehole locations loaded with explosives are to be picked up by survey, and entered into the engineering database by the mining engineer. This will be called the as-built map	Surveyor / Mine Engineer

3.5. Blasting Parameters – Burden & Spacing

In order to produce a rock gradation profile suitable for specified use, the final blast hole spacing will need to be determined from field testing.

3.6. Blasting Parameters – Bench height and wall slopes

Quarry locations have been selected in areas that present stable geological characteristics. The benches will be designed according the topography of the natural grade at the quarry site. A 5 m bench height with a minimum 8 m catchment will be used based on safety and the capabilities of our loading equipment.

3.7. Typical Blast Pattern Designs

The following table may vary depending on bench height.

Table b: Initial Blasting Parameters - 90 mm Borehole

Product	Emulsion
Density (g/cc)	1.26
Load per meter of borehole (kg)	10.22
Bench Height (m)	5.0
Sub-Drill (m)	1.0
Collar (m)	2.3
Load Column (m)	3.7
Load per hole (kg)	38.0
Pattern Type	Equilateral
Spacing (m)	3.8
Burden (m)	3.3
Rock released per hole (m^3)	62.7
Powder Factor (kg/m3)	0.60

4. Drilling and Loading Procedures

4.1. Re-Drill and Explosives Loading Procedure

4.1.1. Objective

To provide Supervisors and workers with a procedure, which will ensure the safety of all personnel on or near a drill pattern where re-drilling of caved or frozen holes on a loaded pattern is necessary.

4.1.2. Scope

The Supervisor shall be responsible to ensure that the workers are trained and follow the procedures.

The driller is responsible to ensure that the procedures are followed as directed by the Supervisor.

4.1.3. Introduction

This procedure was developed to ensure the safety of all personnel involved or close to the blast area.

4.1.4. Definitions

- D&B: Drill & Blast

4.1.5. Preparation

- Requirements: Blasters Certificate, Supervisor Level I
- Tools: Drill, PPE
- Hazards: Charged holes, spillages of explosive material, slips, trips, falls, explosion

4.1.6. Tasks

Table c: Re-Drill and Explosive Loading Procedure

Task	Person Responsible
All holes shall be jigged and visually checked in patterns that have the potential for frozen or caved holes, before loading operations commence.	Blaster / Blast helper / Supervisor
Drill holes that are caved and or frozen and that require re-drilling are to be marked out with flagged stakes.	Blaster / Blast helper / Supervisor
Holes noted for re-drilling will be immediately brought to the attention of the blaster in charge and the Supervisor.	Blaster / Supervisor
The holes requiring re-drilling will be marked in the daily log and noted on the daily blast hole sheets as re-drilled.	Supervisor
No loading of holes closer than 8 meters to the re-drilling operation shall be permitted except under the direct supervision of the Supervisor.	Blaster
The re-drilling shall take place in a retreat direction; all loading operations shall take place away from the travel direction of the drill.	Supervisor
Only personnel directly involved with the drilling and blast hole loading activities are to be within 30 meters of re-drilling operations.	Blaster / Supervisor
No surface delays or detonating cord is to be present within the blast pattern during re-drilling operations.	Supervisor
All down hole Nonel delay detonator ends are to be neatly bundled and tied to the blast hole stake to ensure visibility and minimize the potential of any inadvertent machinery contact.	Blaster
The Supervisor will ensure that the drill operator and blaster walk through the drill pattern prior to moving the drill onto the pattern. The drill operator will be made aware of any loaded blast holes that may come within 2 m of the machine.	Supervisor

The Supervisor will advise the drill operator which blaster will guide the drill onto the loaded pattern, for the purpose of re-drilling	Blaster / Supervisor

4.2. Explosives Management

4.2.1. Objective

To provide Supervisors with a safe and effective standard which will ensure the safety of all employees and equipment. This should be used in conjunction with the Explosives Management Plan (August 29, 2013).

4.2.2. Scope

The Manager shall appoint a person(s) who is/are qualified, certified and authorized under the Mine Health and Safety Act and Regulations of the Northwest Territories / Nunavut to conduct/supervise all blasting operations on the mine site. The Manager shall also be responsible for authorizing persons to enter the explosive magazine for inspection, receiving and issuing of all explosives materials.

4.2.3. Introduction

The NWT / Nunavut Mine, Health & Safety Act and Regulations require a manager to ensure his charges are working safely in a safe environment and in compliance with the regulations, company policy and procedures.

4.2.4. Preparation

- Hazards: Explosives, detonators, delays
- Tools: Blasters Certificate, Supervisor Level I Certificate, Log Book, broom, Magazine key

4.2.5. Tasks

Table d: Explosives Management

Task	Person Responsible
Ensure a copy of the explosives magazine permit is posted inside the magazine.	Area Manager
Carry out a weekly inspection of the magazine and record the results in a logbook.	Blast Supervisor
Ensure a record of all explosives issued and received and the inventory of the magazine is kept, and authorized persons sign all entries.	Blaster/ Supervisor
Ensure the magazine is kept clean, dry and free from grit at all times.	Blaster/ Supervisor
Ensure the stock of explosives is rotated so that the oldest stock is used first.	Blaster/ Supervisor
Ensure all signage is visible and in good condition.	Blaster/ Supervisor
Ensure that the magazine is locked at all times except when an authorized person is present.	Blaster/ Supervisor
Ensure all mobile equipment transporting explosives meets or exceed requirements as set out in the Mine Health and Safety Act and Regulations of the NWT / Nunavut.	Blaster/ Supervisor
Ensure appropriate records of each primary blast are kept.	Blaster/ Supervisor
Ensure all warnings, guarding of access routes and clearance of areas has taken place prior to initiating any blasts.	Blaster/ Supervisor
The appointed person has the authority to safely conduct and direct all activities within the blasting area. All employees must support	Blaster/ Supervisor
Ensure all blasters have a valid blasting certificate issued by the Chief Inspector of Mines.	Blaster/ Supervisor
Ensure all persons who are assisting in the preparation or firing of charges is under the direct supervision of a person who is a valid holder of a blasting	Blaster/ Supervisor

All blasters shall deliver their blasting certificates to the Manager or his designate when commencing employment. The certificate will be returned upon termination with the company.	Blaster/ Supervisor

5. Blasting Protocol and Procedure

5.1. General Protocol

- All blasting operations will follow all protocol of The Northwest Territories / Nunavut Mine Health and Safety Act and Regulations, as well as standard operating procedures from both Baffinland Iron Mines Corporation and subcontractors, whichever is more stringent.
- All records of blasting shall be kept by the Mine Engineering department
- All blasts will be numbered according to location (i.e. quarry number, bench elevation at grade, and individual blast)
- All loaded boreholes will be recorded by survey prior to blasting, and as-built mapping entered into survey database to eliminate possibility of drilling into bootlegs on benches at lower elevations
- The area will be visually surveyed for terrestrial wildlife prior to blasting and the blast delayed, if required, to clear the area of any affected terrestrial wildlife. These include, but are not restricted to caribou, and local carnivores. Nesting birds will be respected according to Baffinland's Terrestrial Environmental Management and Monitoring Plan that abides by Environment Canada's Migratory Birds Act. The Environmental Monitor on-site will be trained in the requirements of the Terrestrial Environmental Management and Monitoring Plan.
- Daily records of all holes loaded and explosive products used will be maintained, recorded, and submitted with blast reports
- All blast design will be subject to change and improvement, as site specific geological conditions dictate
- Wall control issues will be negligible with the plan of day lighting all benches
- Standard Operating Procedures regarding drilling proximity to bootlegs or misfired holes will be reviewed with all drilling and blasting crews and adhered to for all drilling and blasting operations.
- All production holes are to be drilled vertically, to ensure the integrity of projected bootleg locations

5.2. Guarding Typical Quarry Excavation

It is imperative that the guards follow the instructions and not leave their assigned area until told so by the Supervisor. The positions assigned will be outside the Blast Danger Area as determined by the Mine Engineer.

In addition to the guards posted at strategic locations around the blast area, reflective warning signs are recommended to be placed at the outer perimeter of the blasting danger area. The signs shall be deployed prior to the initiation of each blast, and collected afterwards.

While guarding a blast area, the vehicle window facing the "tundra" side must be rolled down slightly. The vehicle must be turned off and put in auxiliary such that the radio remains functional (alternatively: use a hand held radio).

All blasting will be scheduled in the afternoon, around 16h00. A distance of 600m for personnel and 400m for equipment as determined by the Quantity Distance - Explosives Regulatory Division Explosives Safety and Security Branch, Minerals and Metals Sector table of distances. We will not have any blasts with over 11,500 kg of explosives in the blast.

5.3. Guarding Procedure

5.3.1. Objective

To provide the Supervisor with a safe and effective procedure for guarding of a blasting operation.

5.3.2. Scope

The Supervisor is responsible to ensure that all employees engaged in the guarding procedure are trained and understand their duties.

The employees assigned the task of guarding are responsible to follow this procedure as directed by the Supervisor.

5.3.3. Introduction

As per NWT / Nunavut Mine Health and Safety Act and Regulations, these precautions are required.

5.3.4. Definitions

- None

5.3.5. Preparation

- Tools: PPE
- Hazards: Slips, Trips, Falls, Personal injury or death

5.3.6. Tasks

Table e: Requirements and Responsibilities for guarding a blast

Task	Person Responsible
The operations Supervisor will be responsible for appointing all guards and ensuring each guard is fully versed in their responsibilities	Supervisor
The Supervisor is responsible for establishing the limits of the danger zone and the guard post locations.	Supervisor
Upon notification from the Supervisor, all guards will ensure their assigned areas are clear of all personnel, equipment and terrestrial wildlife and proceed to their designated guard posts.	Supervisor / Guards
All guards will notify the Supervisor when they have arrived at their assigned positions, and give a status report of their assigned area.	Supervisor / Guards
No guard shall leave their position or allow any person to enter the blast area until the Supervisor gives the "All Clear"	Supervisor
The Supervisor will ensure all guards are in their assigned location.	Supervisor
The Supervisor will then proceed with the blast.	Supervisor

Following the blast, the Supervisor will announce on the radio, the "All Clear" message. All guards will be removed, crews can return to work in the blast area and regular radio communications can recommence.	Supervisor

5.4. Blasting Procedure

5.4.1. Objective

To provide the Supervisor with a Pre-Blast, Guarding and a Post Blast procedure that will ensure the safety of all personnel and equipment

5.4.2. Scope

The Supervisor shall ensure that all workers who are assigned the duties of a guard during the blasting operations are trained and understand this procedure.

The workers who are assigned guarding duties during the blasting operations will follow this procedure as directed by the Supervisor.

5.4.3. Introduction

This standard operating procedure is to be used to ensure all employees involved, are trained to understand the blasting procedure

5.4.4. Definitions

- None

5.4.5. Preparation

- Tools: PPE, Portable radio, Electric blasting cap, Detonating cord, Blasting wire, Blasting machine
- Hazards: Slips, Trips, Falls, Personal injury of death; Premature detonation

5.4.6. Tasks

Table f: Requirements and Responsibilities for initiation of a Blast Pattern

Task	Person Responsible
The Supervisor will notify all employees of the impending blasting times during the daily crew line up at the beginning of each shift.	Supervisor
The Supervisor will ensure that the daily blasting times are posted at quarry entrances 2 hours before the blasting operation is conducted	Supervisor
The Blaster will give a 2 hour blast warning, by radio, to the following people: Medic, Supervisor, and Security Supervisor. Each of these people will acknowledge, by radio, that they have received and understood the 2 hour blast warning.	Supervisor
The Blaster will contact the Airport Operations Office.	Supervisor
The Supervisor will instruct all workers and equipment operators to evacuate the blasting area at the appropriate time.	Supervisor
The Supervisor, Blaster and Mine Engineer, will determine the “Blast Danger Zone”	Supervisor / Blaster / Mine Engineer
The Supervisor will assign required personnel the duties of guards during the blasting procedure.	Supervisor
The Supervisor will contact the Environmental Supervisor to establish if there have been any significant terrestrial wildlife sightings that the quarry site needs to be aware of.	Supervisor/Environmental Supervisor
The Supervisor will designate the areas to be guarded	Supervisor
The Guards will follow the instructions of the Supervisor.	Guards

The Supervisor will give a 10 minute blast warning, by radio, to the following people: Medic, Security Manager, and Safety Supervisor. Each of these people will acknowledge, by radio, that they have received and understood the 10 minute blast warning.	Supervisor

5.5. Misfires or Cut-off Holes

5.5.1. Objective

To establish a procedure to ensure all misfires/cut-off holes are handled safely and all blasting personnel are fully trained prior to commencing this task.

5.5.2. Scope

The Supervisor shall be responsible for ensuring the blaster follows all safe work practices when performing work on misfired or cut-off holes. These procedures will be reviewed annually or updated when required.

The blaster is responsible to follow this procedure as required by the Supervisor.

5.5.3. Introduction

The NWT / Nunavut Mine Health Safety Act and Regulations require all personnel be adequately trained to do their jobs safely, inspect their worksite or machinery and understand the lock out procedure and fire prevention apparatus and use.

5.5.4. Definitions

- Bootleg: Part of a drilled blast hole that remains when the force of the explosion does not break the rock completely to the bottom of the hole.

5.5.5. Preparation

- Tools: PPE
- Hazards: Slips, trips, and falls, personal injury or death

5.5.6. Tasks

Table g: Misfires or Cut-off Holes

Task	Person Responsible
All workers on a blast pattern will be fully trained in all procedures associated with misfires/cut-off holes.	Workers
Before drilling is commenced, the blaster shall walk the complete pattern to check for any misfire/cut-off holes. The blaster will look for any signs of explosives or lack of ground movement that might indicate a misfire or cut-	Blaster
No person shall drill in loose rock produced by blasting unless the rock has been thoroughly examined by the blaster for explosives, the pattern has been designed to prevent the overlaying of holes and where a hole is discovered containing explosives, drilling will not be closer than 5 m from the hole.	Driller / Blaster
The Supervisor and driller shall not drill or allow drilling to be conducted within 1 m of any part of a bootleg on a blasting pattern or within 5 m of a misfired hole, a cut-off hole or a hole containing explosives.	Supervisor / Blaster
Where an explosive charge has been misfired or cut-off, no work may be performed in the area other than that required making the area safe.	Supervisor / Blaster
All holes must be inspected for detonators or explosives, the blasting area will remain guarded and the hole re-blasted.	Blaster
Once the hole has been cleaned out, the hole may be re-charged, re-stemmed and blasted	Blaster
A hole may be re-drilled for the purpose of re-blasting a missed hole once a Supervisor has determined, after consultation with the driller, the location angle and depth of the hole to be drilled.	Supervisor / Driller
The Supervisor shall supervise the drilling of the hole.	Supervisor

The new hole shall not be closer than 5 m to any part of the missed hole.	Driller
The only explosives that can be removed by washing or lancing from a misfired or cut-off hole include ANFO or slurry/emulsion.	Supervisor / Blaster
The blast pattern shall not be abandoned until it has thoroughly been examined for the presence of explosives in misfired or cut-off holes.	Blaster
Note: If the blaster suspects a misfire, wait ten minutes, and then proceed to check the blast area.	Blaster

6. Excavating Blasted Muck

6.1. Dig Limits for Loading Equipment

6.1.1. Objective

To provide Supervisors and Equipment Operators with a procedure that will enhance safe-working conditions when mucking to a Loaded Blast Face.

6.1.2. Scope

The Supervisor is responsible to ensure that all Loading Equipment Operators are trained and understand this procedure.

All Loading Equipment Operators are responsible to follow the procedure as directed by the Supervisor.

6.1.3. Introduction

NWT / Nunavut Mine Health and Safety Act and Regulations require all personnel be adequately trained to do their jobs safely, inspect their work site or machinery and understand the lock out procedure and fire prevention apparatus and use.

6.1.4. Preparation

- Hazards: Slips, Trips, and Falls
- Tools: Metric measuring tape, red fluorescent paint, survey instrument, stakes, hammer, PPE

6.1.5. Tasks

Table h: Requirements and Responsibilities for mucking into a loaded blast face

Task	Person Responsible
Prior to loading material from any blasted muck pile, the Supervisor will inspect the blasted area. He will consult with the Mine Engineer, to ascertain if there is a charged blast pattern adjacent to the Blasted Material.	Supervisor

The Drill & Blast Supervisor will measure 8 meters perpendicular in front of each charged blast hole in the direction of the blasted material that is to be loaded and position red fluorescent pylons (construction cones) parallel to the charged blast holes.	Supervisor/ Surveyor
The Supervisor is responsible for ensuring that the "Dig Limits" Pylons are in place before loading operations commence.	Supervisor
When facing up the Loading Equipment Operators must stop at the pylons. If a pylon falls down the muck pile the operator must inform the Supervisor immediately. The Loading Equipment will then move laterally to continue progressive loading of the muck pile.	Operator

7. Drill and Blast Employee Responsibilities

7.1. Blast Helpers

7.1.1. Objective

To provide supervisors, blasters and blaster helpers with a procedure for assisting a blaster in the preparation of a blast.

7.1.2. Scope

The Supervisor is responsible to ensure that blast helpers assisting in the preparation of a blast are trained and understand the procedure.

7.1.3. Introduction

This standard operating procedure is to be used for drill and blast operations.

7.1.4. Definitions

- None

7.1.5. Preparation

- Tools: PPE
- Hazards: Slips, trips, and falls, personal injury or death, premature detonation

7.1.6. Tasks

Table i: Requirements and Responsibilities for Blast Helpers

Task	Person Responsible
Before assisting in the preparation of a blast, the blast helper will be trained on the safe handling and preparation of the explosives used during the loading procedure.	Supervisor
Either, Supervisor or the blaster in charge of the blast pattern to be loaded will explain exactly the duties of the blast helper before the work begins.	Supervisor
The blast helper will remain under the direction of the Supervisor or the blaster at all times.	Supervisor
The blast helper will conduct only that part of the blasting operation as directed by the Supervisor or the blaster.	Supervisor

7.2. Drill and Blast Supervisors' Daily Duties

7.2.1. Objective

To provide the Supervisors with a comprehensive inventory of duties to be completed on a daily basis.

7.2.2. Scope

The Superintendent is responsible to ensure all Supervisors are trained and understand this procedure.

The Supervisor is responsible to follow this procedure as directed by the Superintendent.

7.2.3. Introduction

NWT / Nunavut Mine Health and Safety Act and Regulations: require a supervisor to ensure his charges are working safely in a safe environment and in compliance with the regulations, company policy and procedures.

7.2.4. Preparation

- Hazards: Work about charged drill holes, work with explosives, falling rock, slips, trips & falls
- Tools: Blasting Certificate, Supervisor Level I Certificate, PPE

7.2.5. Tasks

Table j: Requirements and Responsibilities of a Supervisor

Task	Person Responsible
The Drill / Blast Supervisor will:	Supervisor
• Do a pre shift site tour.	
• Read and sign the Daily logbook from the previous shift prior to line up.	
• Review maintenance problems and equipment down time with superintendent and previous shifter.	
• Prepare D/B crews work assignments with superintendent.	
• Prepare daily safety toolbox meeting notes	
• Provide instructions to the D/B crew for the daily work assignments	
• Directs the blaster and helper to prepare all explosives for the days activities.	
• Drill crews are transported to the drill locations. Review previous shift with the off-going driller.	
• The area is inspected and the drillers' duties are reviewed.	
• The night shift crews are transported to the line-up area	
• Record all information in the D/B Daily Logbook. Completed the required documentation for the night-shift crews.	
• Participate and provide information during the daily production meeting for all Mine Supervisors and Managers.	

DUTIES IN THE MINE: **The Supervisor will:** • Inspect the area of his/her responsibility, identifying and correcting hazards, sub-standard conditions or non-compliance of procedures, or the NWT / Nunavut Mine Regulations or client.	Supervisor
• Provide on the job observations and instructions to the drill/blast crews.	
• Ensure the mining / quarrying plan is followed regarding drill and blast patterns, as directed by the Superintendent.	
• Ensure the drill/blast crew has the required supplies to complete their daily tasks.	
• Ensure the Mine Supervisor is informed of any hazards that may affect the safety of the mine employees or equipment.	
• Provide directions and instructions to all employees during the blasting operations regarding the notification and guarding during the blast.	
MISCELLANEOUS DUTIES:	Superintendent/ Supervisor/ Safety
• Develop and present timely safety topics at the regular crew Safety meetings.	
• Provide developmental training for drill/blast crews.	
• Under the direction of the Superintendent, provide up-to-date information regarding manpower, production targets or delays, order and track consumables, complete special assignments, ensure that explosives are handled properly and security is maintained.	

APPENDIX A – Concordance Tables

Table A-1: NIRB Project Certificate No.005 Conditions Relevant to this Plan

Number	Condition	Section
20	To ensure that the effects associated with the manufacturing, storage, transportation and use of explosives do not negatively impact the areas surrounding the Project.	2.11
44	The Proponent shall meet or exceed the guidelines set by Fisheries and Oceans Canada for blasting thresholds and implement practical and effective measures to ensure that residue and by-products of blasting do not negatively affect fish and fish habitat.	2.4; 2.10; 2.11
60	Prior to construction, the Proponent shall develop a detailed blasting program to minimize the effects of blasting on terrestrial wildlife that includes, but is not limited to the restriction of blasting when migrating caribou, sensitive local carnivores or birds may be negatively affected.	5.1; 5.3.6
65	The Proponent shall ensure all employees working at project sites receive awareness training regarding the importance of avoiding known nests and nesting areas and large concentrations of foraging and moulting birds.	5.1
66	If Species at Risk or their nests and eggs are encountered during Project activities or monitoring programs, the primary mitigation measure must be avoidance. The Proponent shall establish clear zones of avoidance on the basis of the species-specific nest setback distances outlined in the Terrestrial Environment Management and Monitoring Plan.	5.1
70	The Proponent shall protect any nests found (or indicated nests) with a buffer zone determined by the setback distances outlined in its Terrestrial Environment Mitigation and Monitoring Plan, until the young have fledged. If it is determined that observance of these setbacks is not feasible, the Proponent will develop nest-specific guidelines and procedures to ensure bird’s nests and their young are protected.	5.1

Table A-2: Type A Water Licence (2AM-MRY1235) Conditions Relevant to this Plan

Table A-2: Type A Water Licence (2AM-MRY1235) Conditions Relevant to this Plan

Part	Number	Condition	Section
D	14	The Licensee shall maintain a minimum of thirty-one (31) metre undisturbed buffer zone between the periphery of Quarry sites and the ordinary High Water Mark of any water body unless otherwise approved by the Board in writing. The Licensee shall not excavate and/or remove material from any Quarry beyond a depth of one (1) meter above the ordinary High Water Mark or above the groundwater table, to prevent the potential contamination of groundwater unless otherwise approved by the Board in writing. The Licensee shall construct and operate the Mine Site and associated infrastructure and facilities in accordance with all applicable legislation and industry standards.	2.2
D	15	All surface runoff from Quarry activities for the Project, where flow may directly or indirectly enter a Water body, shall be sampled Weekly and not exceed the Effluent quality limits under Part D, Item 16.	2.9 and 2.11
D	20	The Licensee shall prevent any chemicals, fuel or wastes associated with the undertaking from entering any Water body.	2.4 and 2.11
I	23	The Licensee shall monitor runoff and/or discharge from borrow pits and rock Quarry sites, on a monthly basis, for the following parameters: Total Suspend Solid (TSS) Oil and Grease Ammonia (total NH3-N) Nitrate (total NO3-N) pH Conductivity; and Demonstrate to be non-acutely toxic.	2.11

Appendix C

Geochemical Sampling Results for Q1

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Modified ABA

10-October-2013

Baffinland Iron Mines Corp
Attn : Jim Millard

#300-2278 Upper Middle Road East, Oakville
Canada, L6H 0C3
Phone: 416-364-8820, Fax:416-364-0193

Date Rec. : 06 September 2013
LR Report: **CA12201-SEP13**
Reference: Mary River Project Quarry Testing

Copy: #1

CERTIFICATE OF ANALYSIS

Final Report

Sample ID	Sample Date & Time	Paste pH units	Fizz Rate ---	Sample weight g	HCl added mL	HCl Normality	NaOH Normality	NaOH to pH=8.3 mL	Final pH units
3: Analysis Approval Date		15-Nov-12	15-Nov-12	15-Nov-12	15-Nov-12	15-Nov-12	15-Nov-12	15-Nov-12	15-Nov-12
4: Analysis Approval Time		13:10	13:10	13:10	13:10	13:10	13:10	13:10	13:10
5: Q1-10-1	09-Jun-13	9.41	2	2.04	20.00	0.10	0.10	11.94	1.49
6: Q1-10-2	09-Jun-13	9.13	2	2.05	20.00	0.10	0.10	8.45	1.71
7: Q1-10-3	09-Jun-13	9.45	2	2.03	20.00	0.10	0.10	9.44	1.64
8: Q1-10-4	09-Jun-13	9.39	2	1.99	20.00	0.10	0.10	11.11	1.52
9: Q1-10-5	09-Jun-13	9.29	2	2.02	20.00	0.10	0.10	10.35	1.59
10: Q1-10-6	09-Jun-13	9.30	2	1.99	20.00	0.10	0.10	13.20	1.47
11: Q1-10-7	09-Jun-13	9.17	2	1.98	33.80	0.10	0.10	16.28	1.56
12: Q1-10-8	09-Jun-13	9.46	2	2.05	20.00	0.10	0.10	9.44	1.63
13: Q1-20-1	13-Jun-13	9.67	2	1.96	20.00	0.10	0.10	16.32	1.25
14: Q1-20-2	13-Jun-13	9.31	2	1.97	20.00	0.10	0.10	12.31	1.46
15: Q1-20-3	13-Jun-13	9.54	2	2.03	20.00	0.10	0.10	15.67	1.28
16: Q1-20-4	13-Jun-13	9.51	2	2.01	20.00	0.10	0.10	13.64	1.35
17: Q1-20-5	13-Jun-13	9.83	2	1.98	20.00	0.10	0.10	17.60	1.15
18: Q1-20-6	13-Jun-13	9.82	2	2.02	20.00	0.10	0.10	18.40	1.14
19: Q1-20-7	13-Jun-13	9.64	2	1.97	20.00	0.10	0.10	12.79	1.36
20: Q1-20-8	13-Jun-13	9.65	2	2.01	20.00	0.10	0.10	13.45	1.35
21: Q1-30-1	22-Jun-13	9.59	2	2.03	20.00	0.10	0.10	15.75	1.25

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LR Report : CA12201-SEP13

Sample ID	Sample Date & Time	Paste pH units	Fizz Rate ---	Sample weight g	HCl added mL	HCl Normality	NaOH Normality	NaOH to pH=8.3 mL	Final pH units
22: Q1-30-2	22-Jun-13	9.78	2	2.00	20.00	0.10	0.10	18.08	1.14
23: Q1-30-3	22-Jun-13	9.77	2	2.01	20.00	0.10	0.10	18.35	1.15
24: Q1-30-4	22-Jun-13	8.03	1	1.97	35.80	0.10	0.10	23.75	1.86
25: Q1-30-5	22-Jun-13	7.71	1	1.97	27.30	0.10	0.10	17.94	1.83
26: Q1-30-6	22-Jun-13	9.84	2	1.99	29.20	0.10	0.10	16.34	1.22
27: Q1-30-7	22-Jun-13	9.71	2	2.03	20.00	0.10	0.10	16.66	1.17
28: Q1-30-8	22-Jun-13	9.66	2	1.99	20.00	0.10	0.10	17.58	1.16
29: Q1-40-1	22-Jun-13	9.71	2	1.98	20.00	0.10	0.10	16.34	1.20
30: Q1-40-2	05-Jul-13	9.74	2	2.00	20.00	0.10	0.10	17.32	1.20
31: Q1-40-3	05-Jul-13	9.80	2	2.00	20.00	0.10	0.10	17.42	1.20
32: Q1-40-4	05-Jul-13	9.77	2	1.97	20.00	0.10	0.10	17.16	1.18
33: Q1-40-5	05-Jul-13	9.75	2	2.00	20.00	0.10	0.10	16.67	1.24
34: Q1-40-6	05-Jul-13	9.90	2	1.97	20.00	0.10	0.10	16.54	1.39
35: Q1-40-7	05-Jul-13	9.90	2	2.00	20.00	0.10	0.10	16.65	1.34
36: Q1-40-8	05-Jul-13	9.85	2	2.05	20.00	0.10	0.10	15.99	1.38
37: Q1-50-1	09-Jul-13	9.95	2	2.01	20.00	0.10	0.10	16.50	1.29
38: Q1-50-2	09-Jul-13	9.83	2	2.01	20.00	0.10	0.10	16.61	1.27
39: Q1-50-3	09-Jul-13	9.85	2	2.05	20.00	0.10	0.10	16.14	1.31
40: Q1-50-4	09-Jul-13	9.71	2	1.97	20.00	0.10	0.10	16.63	1.25
41: Q1-50-5	09-Jul-13	9.75	2	2.00	20.00	0.10	0.10	16.48	1.27
42: Q1-50-6	09-Jul-13	9.82	2	2.04	20.00	0.10	0.10	17.13	1.19
43: Q1-50-7	09-Jul-13	9.89	2	2.04	20.00	0.10	0.10	16.76	1.26
44: Q1-50-8	09-Jul-13	9.75	2	1.99	20.00	0.10	0.10	15.61	1.25
45: Q1-60-1	17-Jul-13	9.54	3	1.99	29.50	0.10	0.10	13.84	1.63
46: Q1-60-2	17-Jul-13	9.53	2	2.01	20.00	0.10	0.10	13.74	1.38
47: Q1-60-3	17-Jul-13	9.77	2	2.05	20.00	0.10	0.10	16.11	1.29
48: Q1-60-4	17-Jul-13	9.73	2	2.00	20.00	0.10	0.10	14.14	1.36
49: Q1-60-5	17-Jul-13	9.85	2	1.98	20.00	0.10	0.10	16.41	1.27
50: Q1-60-6	17-Jul-13	9.87	2	2.04	20.00	0.10	0.10	16.36	1.29
51: Q1-60-7	17-Jul-13	9.74	3	1.99	20.00	0.10	0.10	10.93	1.62
52: Q1-60-8	17-Jul-13	9.54	3	2.02	20.00	0.10	0.10	16.75	1.81
53: Q1-70-1	23-Jul-13	9.87	2	2.00	20.00	0.10	0.10	17.19	1.27
54: Q1-70-2	23-Jul-13	9.47	2	2.01	20.00	0.10	0.10	16.62	1.21
55: Q1-70-3	23-Jul-13	9.06	3	2.01	33.90	0.10	0.10	16.84	1.54

OnLine LIMS

0000035034

SGS Canada Inc.
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Sample ID	Sample Date & Time	Paste pH units	Fizz Rate ---	Sample weight g	HCl added mL	HCl Normality	NaOH Normality	NaOH to pH=8.3 mL	Final pH units
56: Q1-70-4	23-Jul-13	9.65	2	1.96	20.00	0.10	0.10	16.03	1.28
57: Q1-70-5	23-Jul-13	9.85	2	2.01	20.00	0.10	0.10	8.74	1.30
58: Q1-70-6	23-Jul-13	9.28	2	2.03	20.00	0.10	0.10	9.82	1.64
59: Q1-70-7	23-Jul-13	9.89	2	2.03	20.00	0.10	0.10	16.63	1.24
60: Q1-70-8	23-Jul-13	9.51	3	2.02	20.00	0.10	0.10	9.54	1.69
61: Q1-90-1	08-Aug-13	9.82	2	2.01	20.00	0.10	0.10	15.86	1.23
62: Q1-90-2	08-Aug-13	9.81	2	1.99	20.00	0.10	0.10	17.08	1.11
63: Q1-90-3	08-Aug-13	9.67	2	2.01	20.00	0.10	0.10	11.98	1.18
64: Q1-90-4	08-Aug-13	9.59	2	1.98	20.00	0.10	0.10	9.74	1.40
65: Q1-90-5	08-Aug-13	9.72	2	2.00	20.00	0.10	0.10	15.13	1.14
66: Q1-90-6	08-Aug-13	9.83	2	1.98	20.00	0.10	0.10	17.52	1.07
67: Q1-90-7	08-Aug-13	9.69	2	2.03	20.00	0.10	0.10	15.59	0.97
68: Q1-90-8	08-Aug-13	9.68	2	2.02	20.00	0.10	0.10	11.11	1.29
69: MP-80-1	02-Jul-13	9.73	2	2.03	20.00	0.10	0.10	13.97	1.16
70: MP-80-2	02-Jul-13	9.72	2	2.01	20.00	0.10	0.10	12.65	0.94
71: MP-80-3	02-Jul-13	9.62	2	2.01	20.00	0.10	0.10	15.32	0.93
72: MP-80-4	02-Jul-13	9.57	2	2.03	32.30	0.10	0.10	11.76	1.50
73: MP-80-5	02-Jul-13	9.63	2	2.00	32.50	0.10	0.10	9.83	1.32
74: MP-80-6	02-Jul-13	9.50	3	1.96	20.00	0.10	0.10	13.62	1.45
75: MP-80-7	02-Jul-13	9.76	2	2.04	20.00	0.10	0.10	15.92	1.06
76: MP-80-8	02-Jul-13	9.36	2	1.98	106.40	0.10	0.10	20.87	1.86
77: MS-CP-1	12-Aug-13	9.28	2	2.02	20.00	0.10	0.10	11.33	1.48
78: MS-CP-2	12-Aug-13	9.26	2	1.99	20.00	0.10	0.10	13.70	1.39
79: MS-CP-3	12-Aug-13	9.35	2	2.00	20.00	0.10	0.10	12.50	1.52
80: MS-CP-4	12-Aug-13	9.22	3	2.04	29.50	0.10	0.10	16.17	1.71
81: MS-CP-5	12-Aug-13	9.21	2	2.02	20.00	0.10	0.10	13.81	1.52
82: MS-CP-6	12-Aug-13	9.29	2	2.00	20.00	0.10	0.10	12.55	1.73
83: MS-CP-7	12-Aug-13	8.73	3	2.02	53.50	0.10	0.10	17.56	1.69
84: MS-CP-8	12-Aug-13	8.95	2	2.00	20.00	0.10	0.10	15.64	1.53
85: MS-CP-9	12-Aug-13	9.16	2	2.01	20.00	0.10	0.10	14.41	1.48
86: MS-CP-10	12-Aug-13	9.12	2	1.99	20.00	0.10	0.10	13.77	1.22
87: MS-CP-11	12-Aug-13	8.95	2	2.02	20.00	0.10	0.10	7.50	1.87
88: MS-CP-12	12-Aug-13	8.92	3	2.00	53.90	0.10	0.10	16.02	1.83
89: MS-CP-13	12-Aug-13	9.15	2	1.99	20.00	0.10	0.10	8.84	1.72

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Modified ABA

LR Report : **CA12201-SEP13**

Sample ID	Sample Date & Time	Paste pH units	Fizz Rate ---	Sample weight g	HCl added mL	HCl Normality	NaOH Normality	NaOH to pH=8.3 mL	Final pH units
90: MS-CP-14	12-Aug-13	9.24	2	1.99	20.00	0.10	0.10	14.06	1.49
91: MS-CP-15	12-Aug-13	9.16	2	2.02	20.00	0.10	0.10	14.70	1.41
92: MS-CP-16	12-Aug-13	9.15	2	2.03	28.20	0.10	0.10	13.29	1.60
93: MS-CP-17	12-Aug-13	8.97	2	2.00	20.00	0.10	0.10	15.05	1.48
94: MS-CP-18	12-Aug-13	9.00	2	2.03	20.00	0.10	0.10	15.61	1.49
95: MS-CP-19	12-Aug-13	9.02	2	1.98	20.00	0.10	0.10	13.95	1.82
96: MS-CP-20	12-Aug-13	8.95	2	1.97	20.00	0.10	0.10	15.01	1.69
97: MS-CP-21	12-Aug-13	9.05	2	1.97	20.00	0.10	0.10	14.33	1.59
98: MS-CP-22	12-Aug-13	9.00	2	2.03	20.00	0.10	0.10	13.42	1.28
99: MS-CP-23	12-Aug-13	8.89	2	1.98	20.00	0.10	0.10	13.98	1.93
100: MS-CP-24	12-Aug-13	8.95	2	2.06	20.00	0.10	0.10	15.47	1.69
101: MS-Q104-1	12-Aug-13	8.67	2	1.99	20.00	0.10	0.10	17.98	1.35
102: MS-Q104-2	12-Aug-13	9.05	2	1.97	20.00	0.10	0.10	16.41	1.48
103: MS-Q104-3	12-Aug-13	8.63	2	1.98	20.00	0.10	0.10	16.92	1.44
104: MS-Q104-4	12-Aug-13	8.52	2	1.97	20.00	0.10	0.10	17.67	1.39
105: MS-Q104-5	12-Aug-13	8.99	2	1.99	20.00	0.10	0.10	14.91	1.66
106: MS-Q104-6	12-Aug-13	8.94	2	2.00	29.60	0.10	0.10	14.12	1.78
107: MS-Q104-7	12-Aug-13	9.01	2	1.99	20.00	0.10	0.10	14.71	1.80
108: MS-Q104-8	12-Aug-13	9.24	2	2.05	20.00	0.10	0.10	17.50	1.34

SGS Canada Inc.
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```
*NP (Neutralization Potential)
 = 50 x (N of HCL x Total HCL added - N NaOH x NaOH added)
   ------------------------------------------------------
                        Weight of Sample

*AP (Acid Potential) = % Sulphide Sulphur x 31.25
*Net NP (Net Neutralization Potential) = NP-AP
NP/AP Ratio = NP/AP
*Results expressed as tonnes CaCO3 equivalent/1000 tonnes of material
Samples with a % Sulphide value of <0.01 will be calculated using a 0.01 value.

Sulphur analysis performed following BC ARD Guidelines (Price 1997)
```

Brian Graham B.Sc.
Project Specialist
Environmental Services, Analytical

OnLine LIMS

0000035034

Modified ABA

SGS Canada Inc.
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10-October-2013

Baffinland Iron Mines Corp
Attn : Jim Millard

#300-2278 Upper Middle Road East, Oakville
Canada, L6H 0C3
Phone: 416-364-8820, Fax:416-364-0193

Date Rec. : 06 September 2013
LR Report: **CA12201-SEP13**
Reference: Mary River Project Quarry Testing

Copy: #1

CERTIFICATE OF ANALYSIS

Final Report

Sample ID	NP t CaCO3/1000 t	AP t CaCO3/1000 t	Net NP t CaCO3/1000 t	NP/AP ratio	Sulphur (total) %	Acid Leachable SO4-S %	Sulphide %	Carbon (total) %	Carbonate %
3: Analysis Approval Date	15-Nov-12	---	---	---	02-Nov-12	---	09-Oct-13	04-Oct-13	09-Oct-13
4: Analysis Approval Time	13:10	---	---	---	16:03	---	10:43	13:09	10:35
5: Q1-10-1	20	0.31	19.5	63.9	0.010	0.01	< 0.01	0.276	0.814
6: Q1-10-2	28	0.31	27.9	91.0	0.024	0.02	< 0.01	0.443	1.29
7: Q1-10-3	26	0.31	25.7	83.9	0.017	0.02	< 0.01	0.364	1.21
8: Q1-10-4	22	0.31	22.0	71.9	0.018	0.02	< 0.01	0.308	1.00
9: Q1-10-5	24	0.31	23.6	77.1	0.023	0.02	< 0.01	0.336	1.04
10: Q1-10-6	17	0.31	16.8	55.2	0.020	0.02	< 0.01	0.209	0.595
11: Q1-10-7	44	0.31	43.9	143	0.024	0.02	< 0.01	0.640	2.17
12: Q1-10-8	26	0.31	25.5	83.2	0.017	0.02	< 0.01	0.365	1.23
13: Q1-20-1	9.4	0.31	9.09	30.3	0.016	0.02	< 0.01	0.113	0.300
14: Q1-20-2	20	0.31	19.2	62.9	0.019	0.02	< 0.01	0.309	0.814
15: Q1-20-3	11	0.31	10.4	34.5	0.014	0.01	< 0.01	0.140	0.380
16: Q1-20-4	16	0.31	15.5	51.0	0.020	0.02	< 0.01	0.244	0.654
17: Q1-20-5	6.0	0.31	5.69	19.4	0.007	< 0.01	< 0.01	0.062	0.130
18: Q1-20-6	4.0	0.31	3.69	12.9	0.009	< 0.01	< 0.01	0.033	0.040
19: Q1-20-7	18	0.31	18.0	59.0	0.009	< 0.01	< 0.01	0.264	0.754
20: Q1-20-8	16	0.31	16.0	52.6	0.008	< 0.01	< 0.01	0.232	0.669
21: Q1-30-1	10	0.31	10.2	33.9	0.013	0.01	< 0.01	0.130	0.350

OnLine LIMS

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Modified ABA

LR Report : **CA12201-SEP13**

Sample ID	NP t CaCO3/1000 t	AP t CaCO3/1000 t	Net NP t CaCO3/1000 t	NP/AP ratio	Sulphur (total) %	Acid Leachable SO4-S %	Sulphide %	Carbon (total) %	Carbonate %
22: Q1-30-2	4.8	0.31	4.49	15.5	0.010	0.01	< 0.01	0.030	0.040
23: Q1-30-3	4.1	0.31	3.79	13.2	0.010	0.01	< 0.01	0.024	0.020
24: Q1-30-4	31	0.31	30.3	98.7	0.011	0.01	< 0.01	0.028	0.030
25: Q1-30-5	24	0.31	23.5	76.8	0.027	0.03	< 0.01	0.490	1.57
26: Q1-30-6	32	0.31	32.0	104	0.012	0.01	< 0.01	0.069	0.175
27: Q1-30-7	8.2	0.31	7.89	26.5	0.014	0.01	< 0.01	0.059	0.100
28: Q1-30-8	6.1	0.31	5.79	19.7	0.013	0.01	< 0.01	0.036	0.055
29: Q1-40-1	9.2	0.31	8.89	29.7	0.011	0.01	< 0.01	0.052	0.065
30: Q1-40-2	6.7	0.31	6.39	21.6	0.010	0.01	< 0.01	0.046	0.080
31: Q1-40-3	6.5	0.31	6.19	21.0	0.012	0.01	< 0.01	0.038	0.055
32: Q1-40-4	7.2	0.31	6.89	23.2	0.013	0.01	< 0.01	0.052	0.075
33: Q1-40-5	8.3	0.31	7.99	26.8	0.011	0.01	< 0.01	0.058	0.095
34: Q1-40-6	8.8	0.31	8.49	28.4	0.012	0.01	< 0.01	0.055	0.055
35: Q1-40-7	8.4	0.31	8.09	27.1	0.012	0.01	< 0.01	0.060	0.070
36: Q1-40-8	9.8	0.31	9.49	31.6	0.013	0.01	< 0.01	0.101	0.110
37: Q1-50-1	8.7	0.31	8.39	28.1	0.013	0.01	< 0.01	0.055	0.065
38: Q1-50-2	8.4	0.31	8.09	27.1	0.011	0.01	< 0.01	0.060	0.075
39: Q1-50-3	9.4	0.31	9.09	30.3	0.014	0.01	< 0.01	0.079	0.175
40: Q1-50-4	8.6	0.31	8.29	27.7	0.014	0.01	< 0.01	0.069	0.120
41: Q1-50-5	8.8	0.31	8.49	28.4	0.016	0.02	< 0.01	0.068	0.120
42: Q1-50-6	7.0	0.31	6.69	22.6	0.011	0.01	< 0.01	0.039	0.055
43: Q1-50-7	7.9	0.31	7.59	25.5	0.010	0.01	< 0.01	0.048	0.055
44: Q1-50-8	11	0.31	10.7	35.5	0.019	0.02	< 0.01	0.094	0.230
45: Q1-60-1	39	0.31	39.0	127	0.010	0.01	< 0.01	0.504	1.81
46: Q1-60-2	16	0.31	15.3	50.3	0.016	0.02	< 0.01	0.171	0.425
47: Q1-60-3	9.5	0.31	9.19	30.6	0.018	0.02	< 0.01	0.084	0.155
48: Q1-60-4	15	0.31	14.4	47.4	0.014	0.01	< 0.01	0.154	0.410
49: Q1-60-5	9.1	0.31	8.79	29.4	0.010	0.01	< 0.01	0.059	0.135
50: Q1-60-6	8.9	0.31	8.59	28.7	0.012	0.01	< 0.01	0.063	0.120
51: Q1-60-7	23	0.31	22.5	73.5	0.012	0.01	< 0.01	0.263	0.819
52: Q1-60-8	8.0	0.31	7.69	25.8	0.011	0.01	< 0.01	0.354	1.14
53: Q1-70-1	7.0	0.31	6.69	22.6	0.016	0.02	< 0.01	0.049	0.050
54: Q1-70-2	8.4	0.31	8.09	27.1	0.017	0.02	< 0.01	0.049	0.055
55: Q1-70-3	42	0.31	42.1	137	0.015	0.02	< 0.01	0.522	1.68

OnLine LIMS

0000035040

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Sample ID	NP t CaCO3/1000 t	AP t CaCO3/1000 t	Net NP t CaCO3/1000 t	NP/AP ratio	Sulphur (total) %	Acid Leachable SO4-S %	Sulphide %	Carbon (total) %	Carbonate %
56: Q1-70-4	10	0.31	9.79	32.6	0.029	0.02	0.01	0.046	0.040
57: Q1-70-5	28	0.31	27.7	90.3	0.018	0.02	< 0.01	0.072	0.170
58: Q1-70-6	25	0.31	24.8	81.0	0.025	0.02	< 0.01	0.300	0.809
59: Q1-70-7	8.3	0.31	7.99	26.8	0.012	0.01	< 0.01	0.029	0.020
60: Q1-70-8	26	0.31	25.6	83.5	0.017	0.02	< 0.01	0.299	0.914
61: Q1-90-1	10	0.31	9.99	33.2	0.011	0.01	< 0.01	0.078	0.160
62: Q1-90-2	7.3	0.31	6.99	23.5	0.010	0.01	< 0.01	0.047	0.055
63: Q1-90-3	20	0.31	19.7	64.5	0.011	0.01	< 0.01	0.218	0.674
64: Q1-90-4	26	0.31	25.6	83.5	0.012	0.01	< 0.01	0.312	1.08
65: Q1-90-5	12	0.31	11.9	39.4	0.011	0.01	< 0.01	0.112	0.315
66: Q1-90-6	6.3	0.31	5.99	20.3	0.008	< 0.01	< 0.01	0.026	0.030
67: Q1-90-7	11	0.31	10.6	35.2	0.010	0.01	< 0.01	0.093	0.190
68: Q1-90-8	22	0.31	21.7	71.0	0.010	0.01	< 0.01	0.270	0.859
69: MP-80-1	15	0.31	14.6	48.1	0.012	0.01	< 0.01	0.151	0.425
70: MP-80-2	18	0.31	18.0	59.0	0.012	0.01	< 0.01	0.161	0.475
71: MP-80-3	12	0.31	11.3	37.4	0.010	0.01	< 0.01	0.088	0.150
72: MP-80-4	51	0.31	50.3	163	0.011	0.01	< 0.01	0.642	2.48
73: MP-80-5	57	0.31	56.4	183	0.011	0.01	< 0.01	0.298	1.06
74: MP-80-6	16	0.31	16.0	52.6	0.010	0.01	< 0.01	0.617	2.34
75: MP-80-7	10	0.31	9.69	32.3	0.011	0.01	< 0.01	0.061	0.125
76: MP-80-8	216	0.31	216	697	0.012	0.01	< 0.01	2.59	11.1
77: MS-CP-1	22	0.31	21.2	69.4	0.021	0.02	< 0.01	0.176	0.400
78: MS-CP-2	16	0.31	15.5	51.0	0.020	0.02	< 0.01	0.170	0.230
79: MS-CP-3	19	0.31	18.4	60.3	0.023	0.02	< 0.01	0.124	0.215
80: MS-CP-4	33	0.31	32.4	105	0.022	0.01	0.01	0.409	1.02
81: MS-CP-5	15	0.31	15.0	49.4	0.030	0.02	0.01	0.072	0.065
82: MS-CP-6	19	0.31	18.3	60.0	0.021	0.02	< 0.01	0.213	0.490
83: MS-CP-7	89	0.31	88.7	287	0.014	0.01	< 0.01	1.21	4.48
84: MS-CP-8	11	0.31	10.6	35.2	0.032	0.02	0.01	0.033	0.020
85: MS-CP-9	14	0.31	13.6	44.8	0.022	0.02	< 0.01	0.134	0.200
86: MS-CP-10	16	0.31	15.3	50.3	0.029	0.02	0.01	0.154	0.170
87: MS-CP-11	31	0.31	30.6	99.7	0.024	0.02	< 0.01	0.405	0.849
88: MS-CP-12	95	0.31	94.4	305	0.017	0.02	< 0.01	1.18	4.76
89: MS-CP-13	28	0.31	27.7	90.3	0.018	0.02	< 0.01	0.336	1.03

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Modified ABA

LR Report : **CA12201-SEP13**

Sample ID	NP t CaCO3/1000 t	AP t CaCO3/1000 t	Net NP t CaCO3/1000 t	NP/AP ratio	Sulphur (total) %	Acid Leachable SO4-S %	Sulphide %	Carbon (total) %	Carbonate %
90: MS-CP-14	15	0.31	14.6	48.1	0.020	0.02	< 0.01	0.150	0.330
91: MS-CP-15	13	0.31	12.8	42.3	0.028	0.02	0.01	0.123	0.125
92: MS-CP-16	37	0.31	36.4	118	0.019	0.02	< 0.01	0.446	1.37
93: MS-CP-17	12	0.31	12.1	40.0	0.030	0.02	0.01	0.026	0.015
94: MS-CP-18	11	0.31	10.5	34.8	0.025	0.02	< 0.01	0.021	0.025
95: MS-CP-19	15	0.31	15.0	49.4	0.031	0.02	0.01	0.078	0.115
96: MS-CP-20	13	0.31	12.4	41.0	0.033	0.02	0.01	0.028	0.015
97: MS-CP-21	14	0.31	14.1	46.5	0.027	0.03	< 0.01	0.045	0.045
98: MS-CP-22	16	0.31	15.9	52.3	0.028	0.02	0.01	0.029	0.020
99: MS-CP-23	15	0.31	14.9	49.0	0.035	0.02	0.01	0.055	0.060
100: MS-CP-24	11	0.31	10.7	35.5	0.023	0.02	< 0.01	0.025	0.020
101: MS-Q104-1	5.1	0.31	4.79	16.5	0.017	0.02	< 0.01	0.021	0.010
102: MS-Q104-2	9.1	0.31	8.79	29.4	0.022	0.02	< 0.01	0.031	0.020
103: MS-Q104-3	7.8	0.31	7.49	25.2	0.020	0.02	< 0.01	0.027	0.020
104: MS-Q104-4	5.9	0.31	5.59	19.0	0.023	0.02	< 0.01	0.014	0.015
105: MS-Q104-5	13	0.31	12.5	41.3	0.034	0.02	0.01	0.054	0.040
106: MS-Q104-6	39	0.31	38.4	125	0.022	0.02	< 0.01	0.429	1.26
107: MS-Q104-7	13	0.31	13.0	42.9	0.033	0.02	0.01	0.054	0.045
108: MS-Q104-8	6.1	0.31	5.79	19.7	0.012	0.01	< 0.01	0.052	0.035

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```
*NP (Neutralization Potential)
 = 50 x (N of HCL x Total HCL added - N NaOH x NaOH added)
   ------------------------------------------------------
                        Weight of Sample
```

*AP (Acid Potential) = % Sulphide Sulphur x 31.25
*Net NP (Net Neutralization Potential) = NP-AP
NP/AP Ratio = NP/AP
*Results expressed as tonnes $CaCO_3$ equivalent/1000 tonnes of material
Samples with a % Sulphide value of <0.01 will be calculated using a 0.01 value.

Sulphur analysis performed following BC ARD Guidelines (Price 1997)

Brian Graham B.Sc.
Project Specialist
Environmental Services, Analytical

OnLine LIMS

0000035040

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Aqua regia

Baffinland Iron Mines Corp
Attn : Jim Millard

#300-2278 Upper Middle Road East, Oakville
Canada, L6H 0C3
Phone: 416-364-8820, Fax:416-364-0193

07-October-2013

Date Rec. : 06 September 2013
LR Report: **CA12202-SEP13**
Reference: Mary River Project Quarry Testing

Copy: #1

CERTIFICATE OF ANALYSIS

Final Report

Sample ID	Sample Date & Time	Hg µg/g	Al µg/g	As µg/g	Ba µg/g	Be µg/g	Bi µg/g	Ca µg/g	Cd µg/g	Co µg/g
3: Analysis Approval Date		01-Oct-13	07-Oct-13	30-Sep-13	30-Sep-13	30-Sep-13	30-Sep-13	07-Oct-13	30-Sep-13	30-Sep-13
4: Analysis Approval Time		09:46	11:46	11:12	11:12	11:12	11:12	11:47	11:12	11:12
5: Q1-10-1	09-Jun-13	< 0.05	3900	< 0.5	19	0.20	< 0.09	6000	< 0.02	1.4
6: Q1-10-2	09-Jun-13	< 0.05	3800	< 0.5	18	0.20	< 0.09	7800	< 0.02	1.1
7: Q1-10-3	09-Jun-13	< 0.05	4400	< 0.5	28	0.19	< 0.09	7400	< 0.02	1.4
8: Q1-10-4	09-Jun-13	< 0.05	4100	< 0.5	19	0.23	< 0.09	7300	< 0.02	1.1
9: Q1-10-5	09-Jun-13	< 0.05	4500	< 0.5	22	0.25	< 0.09	7400	< 0.02	1.2
10: Q1-10-6	09-Jun-13	< 0.05	6000	< 0.5	32	0.24	< 0.09	5300	0.02	2.5
11: Q1-10-7	09-Jun-13	< 0.05	3700	< 0.5	17	0.20	< 0.09	10000	< 0.02	1.00
12: Q1-10-8	09-Jun-13	< 0.05	3900	< 0.5	19	0.19	< 0.09	7200	< 0.02	0.97
13: Q1-20-1	13-Jun-13	< 0.05	3900	< 0.5	21	0.19	< 0.09	2500	< 0.02	0.92
14: Q1-20-2	13-Jun-13	< 0.05	3900	< 0.5	21	0.20	< 0.09	5400	< 0.02	0.98
15: Q1-20-3	13-Jun-13	< 0.05	4100	< 0.5	22	0.19	< 0.09	2900	< 0.02	1.0
16: Q1-20-4	13-Jun-13	< 0.05	3800	< 0.5	19	0.19	< 0.09	4300	< 0.02	0.89
17: Q1-20-5	13-Jun-13	< 0.05	3900	< 0.5	23	0.12	< 0.09	1500	< 0.02	0.82
18: Q1-20-6	13-Jun-13	< 0.05	4100	< 0.5	23	0.15	< 0.09	910	< 0.02	0.85
19: Q1-20-7	13-Jun-13	< 0.05	3900	< 0.5	20	0.16	< 0.09	5600	< 0.02	0.88
20: Q1-20-8	13-Jun-13	< 0.05	3900	0.6	23	0.15	< 0.09	4300	< 0.02	0.98
21: Q1-30-1	22-Jun-13	< 0.05	4000	< 0.5	21	0.17	< 0.09	3600	< 0.02	0.90
22: Q1-30-2	22-Jun-13	< 0.05	3900	< 0.5	23	0.15	< 0.09	970	< 0.02	0.84
23: Q1-30-3	22-Jun-13	< 0.05	3800	< 0.5	22	0.14	< 0.09	780	< 0.02	0.83
24: Q1-30-4	22-Jun-13	< 0.05	3800	< 0.5	21	0.13	< 0.09	850	< 0.02	0.82
25: Q1-30-5	22-Jun-13	< 0.05	3900	< 0.5	20	0.20	0.11	7800	< 0.02	0.96

SGS Canada Inc.
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Sample ID	Sample Date & Time	Hg µg/g	Al µg/g	As µg/g	Ba µg/g	Be µg/g	Bi µg/g	Ca µg/g	Cd µg/g	Co µg/g
26: Q1-30-6	22-Jun-13	< 0.05	3900	< 0.5	24	0.15	< 0.09	2100	< 0.02	0.95
27: Q1-30-7	22-Jun-13	< 0.05	3800	< 0.5	20	0.16	< 0.09	1500	< 0.02	0.89
28: Q1-30-8	22-Jun-13	< 0.05	3500	< 0.5	18	0.14	< 0.09	1100	< 0.02	0.79
29: Q1-40-1	22-Jun-13	< 0.05	3800	< 0.5	20	0.15	< 0.09	1300	< 0.02	0.84
30: Q1-40-2	05-Jul-13	< 0.05	4100	< 0.5	22	0.17	< 0.09	1300	< 0.02	0.88
31: Q1-40-3	05-Jul-13	< 0.05	4000	< 0.5	22	0.16	< 0.09	1100	< 0.02	0.86
32: Q1-40-4	05-Jul-13	< 0.05	4000	< 0.5	21	0.16	< 0.09	1300	< 0.02	0.85
33: Q1-40-5	05-Jul-13	< 0.05	4100	0.6	25	0.19	< 0.09	1600	< 0.02	0.96
34: Q1-40-6	05-Jul-13	< 0.05	5400	< 0.5	39	0.24	< 0.09	1400	< 0.02	1.0
35: Q1-40-7	05-Jul-13	< 0.05	5100	< 0.5	35	0.20	< 0.09	1400	< 0.02	1.0
36: Q1-40-8	05-Jul-13	< 0.05	5100	< 0.5	35	0.22	< 0.09	1700	< 0.02	0.96
37: Q1-50-1	09-Jul-13	< 0.05	5100	< 0.5	36	0.21	< 0.09	1500	< 0.02	1.1
38: Q1-50-2	09-Jul-13	< 0.05	4400	< 0.5	27	0.18	< 0.09	1400	< 0.02	0.97
39: Q1-50-3	09-Jul-13	< 0.05	4500	< 0.5	27	0.19	< 0.09	1900	< 0.02	1.00
40: Q1-50-4	09-Jul-13	< 0.05	4300	< 0.5	24	0.20	< 0.09	1700	< 0.02	1.0
41: Q1-50-5	09-Jul-13	< 0.05	4400	< 0.5	26	0.19	< 0.09	1600	< 0.02	0.98
42: Q1-50-6	09-Jul-13	< 0.05	4200	< 0.5	25	0.17	< 0.09	1100	< 0.02	0.96
43: Q1-50-7	09-Jul-13	< 0.05	4500	< 0.5	29	0.19	< 0.09	1200	< 0.02	0.95
44: Q1-50-8	09-Jul-13	< 0.05	4000	< 0.5	22	0.17	< 0.09	2600	< 0.02	0.95
45: Q1-60-1	17-Jul-13	< 0.05	4900	< 0.5	28	0.20	< 0.09	12000	< 0.02	1.2
46: Q1-60-2	17-Jul-13	< 0.05	4600	< 0.5	24	0.23	< 0.09	3900	< 0.02	1.1
47: Q1-60-3	17-Jul-13	< 0.05	4500	< 0.5	27	0.20	0.09	2000	< 0.02	1.0
48: Q1-60-4	17-Jul-13	< 0.05	4300	< 0.5	26	0.20	< 0.09	3600	< 0.02	1.1
49: Q1-60-5	17-Jul-13	< 0.05	4400	< 0.5	25	0.17	< 0.09	1800	< 0.02	0.98
50: Q1-60-6	17-Jul-13	< 0.05	4200	< 0.5	26	0.18	< 0.09	1800	< 0.02	0.94
51: Q1-60-7	17-Jul-13	< 0.05	4900	< 0.5	28	0.19	0.15	6900	< 0.02	1.1
52: Q1-60-8	17-Jul-13	< 0.05	4900	< 0.5	26	0.24	< 0.09	8400	< 0.02	1.3
53: Q1-70-1	23-Jul-13	< 0.05	4800	< 0.5	29	0.19	< 0.09	1200	< 0.02	1.1
54: Q1-70-2	23-Jul-13	< 0.05	4000	< 0.5	20	0.19	< 0.09	1300	< 0.02	0.87
55: Q1-70-3	23-Jul-13	< 0.05	4700	0.5	26	0.23	< 0.09	9200	< 0.02	1.4
56: Q1-70-4	23-Jul-13	< 0.05	4900	< 0.5	25	0.25	< 0.09	1300	< 0.02	1.0
57: Q1-70-5	23-Jul-13	< 0.05	4800	< 0.5	29	0.20	0.09	2500	< 0.02	1.2
58: Q1-70-6	23-Jul-13	< 0.05	4600	0.7	23	0.26	0.25	6500	< 0.02	1.1
59: Q1-70-7	23-Jul-13	< 0.05	4500	< 0.5	29	0.18	< 0.09	890	< 0.02	0.97
60: Q1-70-8	23-Jul-13	< 0.05	4400	0.8	24	0.21	0.09	6600	< 0.02	1.0
61: Q1-90-1	08-Aug-13	< 0.05	4500	< 0.5	30	0.16	< 0.09	2100	< 0.02	1.0
62: Q1-90-2	08-Aug-13	< 0.05	3900	< 0.5	25	0.14	< 0.09	1300	< 0.02	0.89
63: Q1-90-3	08-Aug-13	< 0.05	4500	< 0.5	26	0.17	< 0.09	4600	< 0.02	1.3
64: Q1-90-4	08-Aug-13	< 0.05	4200	0.6	21	0.18	< 0.09	6700	< 0.02	1.00
65: Q1-90-5	08-Aug-13	< 0.05	3700	< 0.5	22	0.15	< 0.09	2600	< 0.02	0.87

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Sample ID	Sample Date & Time	Hg µg/g	Al µg/g	As µg/g	Ba µg/g	Be µg/g	Bi µg/g	Ca µg/g	Cd µg/g	Co µg/g
66: Q1-90-6	08-Aug-13	< 0.05	3800	< 0.5	23	0.14	< 0.09	860	< 0.02	0.87
67: Q1-90-7	08-Aug-13	< 0.05	3900	< 0.5	22	0.16	< 0.09	2100	< 0.02	0.90
68: Q1-90-8	08-Aug-13	< 0.05	3900	0.7	22	0.14	< 0.09	6300	< 0.02	1.1
69: MP-80-1	02-Jul-13	< 0.05	4200	< 0.5	24	0.17	< 0.09	4100	< 0.02	0.94
70: MP-80-2	02-Jul-13	< 0.05	3800	< 0.5	21	0.16	0.10	4000	< 0.02	0.92
71: MP-80-3	02-Jul-13	< 0.05	4100	< 0.5	20	0.17	< 0.09	2100	< 0.02	0.95
72: MP-80-4	02-Jul-13	< 0.05	3900	< 0.5	18	0.17	< 0.09	12000	< 0.02	0.97
73: MP-80-5	02-Jul-13	< 0.05	4100	< 0.5	21	0.17	< 0.09	7300	< 0.02	0.98
74: MP-80-6	02-Jul-13	< 0.05	4000	< 0.5	20	0.16	< 0.09	11000	< 0.02	1.1
75: MP-80-7	02-Jul-13	< 0.05	4300	0.6	28	0.17	< 0.09	1900	< 0.02	0.98
76: MP-80-8	02-Jul-13	< 0.05	3700	0.9	19	0.16	< 0.09	45000	< 0.02	1.2
77: MS-CP-1	12-Aug-13	< 0.05	7200	< 0.5	22	1.1	0.57	3300	0.07	4.9
78: MS-CP-2	12-Aug-13	< 0.05	8300	< 0.5	14	1.2	0.28	2600	0.07	3.6
79: MS-CP-3	12-Aug-13	< 0.05	12000	0.6	13	1.5	1.3	2300	0.06	6.3
80: MS-CP-4	12-Aug-13	< 0.05	8700	0.8	15	1.0	0.43	6000	0.05	5.6
81: MS-CP-5	12-Aug-13	< 0.05	9600	1.0	10	1.7	0.65	1300	0.06	4.4
82: MS-CP-6	12-Aug-13	< 0.05	9600	0.7	15	1.4	0.33	3800	0.06	4.7
83: MS-CP-7	12-Aug-13	< 0.05	3200	1.0	16	0.19	< 0.09	19000	0.03	3.7
84: MS-CP-8	12-Aug-13	< 0.05	16000	< 0.5	8.6	1.6	0.48	1200	0.07	7.6
85: MS-CP-9	12-Aug-13	< 0.05	9000	< 0.5	11	1.4	1.5	2300	0.07	3.8
86: MS-CP-10	12-Aug-13	< 0.05	9800	0.6	20	1.3	0.35	2200	0.05	5.4
87: MS-CP-11	12-Aug-13	< 0.05	8700	0.7	21	0.94	0.28	5500	0.04	4.7
88: MS-CP-12	12-Aug-13	< 0.05	5800	0.5	34	0.48	0.13	20000	0.06	4.5
89: MS-CP-13	12-Aug-13	< 0.05	6300	0.8	18	0.57	0.34	5700	0.05	4.0
90: MS-CP-14	12-Aug-13	< 0.05	7100	< 0.5	12	0.94	0.94	2800	0.06	3.8
91: MS-CP-15	12-Aug-13	< 0.05	9300	< 0.5	15	1.4	1.2	2100	0.19	5.2
92: MS-CP-16	12-Aug-13	< 0.05	9900	1.0	15	1.2	0.60	7400	0.08	5.2
93: MS-CP-17	12-Aug-13	< 0.05	15000	0.6	9.1	1.7	0.54	990	0.07	7.3
94: MS-CP-18	12-Aug-13	< 0.05	14000	< 0.5	9.4	1.6	0.30	760	0.06	6.2
95: MS-CP-19	12-Aug-13	< 0.05	16000	< 0.5	8.9	1.7	0.44	2600	0.06	8.3
96: MS-CP-20	12-Aug-13	< 0.05	18000	< 0.5	9.6	1.9	0.41	950	0.07	8.8
97: MS-CP-21	12-Aug-13	< 0.05	15000	0.6	8.5	1.5	0.57	1500	0.06	8.1
98: MS-CP-22	12-Aug-13	< 0.05	16000	< 0.5	9.0	1.7	0.63	1000	0.06	7.2
99: MS-CP-23	12-Aug-13	< 0.05	20000	0.6	12	1.7	0.42	2000	0.06	11
100: MS-CP-24	12-Aug-13	< 0.05	14000	0.5	7.9	1.5	0.65	920	0.06	7.0
101: MS-Q104-1	12-Aug-13	< 0.05	6200	0.7	5.9	1.5	0.29	630	0.08	1.7
102: MS-Q104-2	12-Aug-13	< 0.05	10000	< 0.5	4.8	2.0	0.21	930	0.07	4.7
103: MS-Q104-3	12-Aug-13	< 0.05	11000	0.8	5.7	1.7	0.14	720	0.06	4.5
104: MS-Q104-4	12-Aug-13	< 0.05	6200	0.5	4.0	1.4	0.40	570	0.06	2.0
105: MS-Q104-5	12-Aug-13	< 0.05	12000	< 0.5	9.4	1.6	0.30	1300	0.04	6.2

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Aqua regia

LR Report : **CA12202-SEP13**

Sample ID	Sample Date & Time	Hg µg/g	Al µg/g	As µg/g	Ba µg/g	Be µg/g	Bi µg/g	Ca µg/g	Cd µg/g	Co µg/g
106: MS-Q104-6	12-Aug-13	< 0.05	8500	0.6	16	1.0	0.19	7600	0.05	5.2
107: MS-Q104-7	12-Aug-13	< 0.05	18000	< 0.5	11	1.8	0.43	1600	0.06	8.5
108: MS-Q104-8	12-Aug-13	< 0.05	4900	< 0.5	9.7	1.5	0.30	980	0.08	1.3

Brian Graham B.Sc.
Project Specialist
Environmental Services, Analytical

OnLine LIMS

0000033048

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Aqua regia

07-October-2013

Baffinland Iron Mines Corp
Attn : Jim Millard

#300-2278 Upper Middle Road East, Oakville
Canada, L6H 0C3
Phone: 416-364-8820, Fax:416-364-0193

Date Rec. : 06 September 2013
LR Report: **CA12202-SEP13**
Reference: Mary River Project Quarry Testing

Copy: #1

CERTIFICATE OF ANALYSIS
Final Report

Sample ID	Cr µg/g	Cu µg/g	Fe µg/g	K µg/g	Li µg/g	Mg µg/g	Mn µg/g	Mo µg/g	Na µg/g	Ni µg/g
3: Analysis Approval Date	30-Sep-13	30-Sep-13	07-Oct-13	07-Oct-13	30-Sep-13	07-Oct-13	30-Sep-13	30-Sep-13	07-Oct-13	30-Sep-13
4: Analysis Approval Time	11:12	11:12	11:45	11:45	11:13	11:45	11:13	11:13	11:45	11:13
5: Q1-10-1	66	2.9	7100	1600	13	3100	110	0.3	570	4.2
6: Q1-10-2	78	2.9	7200	1600	12	4200	100	0.3	510	3.7
7: Q1-10-3	77	2.6	8000	2200	14	4000	120	0.3	590	3.6
8: Q1-10-4	68	2.4	7500	1700	14	3000	110	0.3	540	3.2
9: Q1-10-5	73	2.9	7900	1800	14	3900	120	0.3	550	3.3
10: Q1-10-6	71	5.5	12000	2300	16	4400	150	0.3	700	4.0
11: Q1-10-7	81	2.8	7200	1500	11	6000	100	0.3	560	3.7
12: Q1-10-8	74	2.3	7200	1600	13	4100	110	0.2	560	3.2
13: Q1-20-1	79	3.3	7100	1700	12	2300	110	0.2	640	3.1
14: Q1-20-2	84	2.8	7200	1700	12	3400	100	0.3	600	3.6
15: Q1-20-3	79	2.4	7300	1700	13	2600	110	0.2	590	3.3
16: Q1-20-4	73	2.1	7100	1600	12	3200	100	0.2	540	3.0
17: Q1-20-5	74	1.7	7200	2000	13	1600	110	0.2	690	2.8
18: Q1-20-6	73	1.7	7400	2000	14	1500	110	0.2	680	2.8
19: Q1-20-7	74	2.1	7100	1900	13	2700	100	0.2	660	3.1
20: Q1-20-8	73	2.0	7500	2000	14	3100	110	0.2	640	3.0
21: Q1-30-1	76	2.7	7200	1700	14	1800	120	0.3	620	3.0
22: Q1-30-2	81	2.0	7200	1800	14	1400	130	0.3	670	3.1
23: Q1-30-3	77	1.9	7200	1700	14	1400	130	0.2	650	2.9
24: Q1-30-4	71	1.9	7100	1700	13	1400	130	0.2	650	2.8
25: Q1-30-5	75	2.8	7800	1700	14	5100	120	0.2	560	3.3
26: Q1-30-6	76	2.1	7300	1800	15	1600	130	0.2	630	3.1

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Aqua regia

LR Report : CA12202-SEP13

Sample ID	Cr µg/g	Cu µg/g	Fe µg/g	K µg/g	Li µg/g	Mg µg/g	Mn µg/g	Mo µg/g	Na µg/g	Ni µg/g
27: Q1-30-7	72	2.1	7000	1500	13	1700	120	0.3	580	2.9
28: Q1-30-8	66	1.9	6800	1500	13	1500	110	0.2	490	2.6
29: Q1-40-1	73	3.2	7200	1600	12	1700	110	0.2	580	2.9
30: Q1-40-2	74	2.2	7400	1800	15	1700	120	0.3	610	3.0
31: Q1-40-3	70	2.4	7300	1800	14	1600	120	0.2	630	2.8
32: Q1-40-4	78	2.1	7100	1800	13	1600	120	0.2	630	3.0
33: Q1-40-5	92	2.8	7500	2000	15	1600	130	1.2	660	2.7
34: Q1-40-6	160	4.0	8100	2800	15	1600	140	1.0	1100	4.3
35: Q1-40-7	120	3.3	8100	2500	13	1700	120	1.6	1000	3.2
36: Q1-40-8	140	3.9	8000	2500	13	1800	130	1.0	1000	3.9
37: Q1-50-1	110	3.3	8300	2600	15	1700	130	1.6	1000	3.3
38: Q1-50-2	100	3.0	7600	2100	14	1700	120	1.5	820	3.0
39: Q1-50-3	130	3.7	7900	2100	14	1800	130	0.9	810	3.9
40: Q1-50-4	98	3.0	7800	2000	13	1800	120	1.4	710	2.9
41: Q1-50-5	130	3.7	8000	2000	13	1900	120	0.8	740	3.7
42: Q1-50-6	98	2.7	7800	2000	13	1600	120	1.3	720	2.7
43: Q1-50-7	140	3.8	8000	2200	13	1500	120	0.9	890	4.0
44: Q1-50-8	89	2.7	7600	1800	13	1800	120	1.2	650	2.7
45: Q1-60-1	140	4.3	8900	2500	17	3200	140	0.9	700	4.5
46: Q1-60-2	100	2.7	8200	2000	15	2600	130	1.4	710	3.2
47: Q1-60-3	150	4.1	8300	2000	14	1900	130	1.0	780	4.2
48: Q1-60-4	110	3.7	7600	1900	14	2400	120	1.4	690	3.3
49: Q1-60-5	120	2.7	7800	2100	15	1700	130	0.8	690	3.4
50: Q1-60-6	110	2.7	7600	1900	12	1600	120	1.3	760	3.0
51: Q1-60-7	150	3.5	8800	2400	17	2600	140	0.9	830	4.1
52: Q1-60-8	110	3.6	8500	2300	17	3200	130	1.5	660	3.6
53: Q1-70-1	150	4.5	8500	2200	12	1900	120	1.0	880	5.2
54: Q1-70-2	73	2.1	7000	1700	14	1800	110	0.2	590	3.1
55: Q1-70-3	110	4.3	8500	2200	14	5500	130	1.4	680	4.1
56: Q1-70-4	130	5.1	8700	1900	13	2400	120	0.8	760	4.2
57: Q1-70-5	100	4.6	8600	2400	16	2000	140	1.4	750	3.0
58: Q1-70-6	140	4.6	8500	1900	14	3200	130	1.5	640	4.4
59: Q1-70-7	99	3.5	7600	2000	14	1700	120	1.4	780	2.9
60: Q1-70-8	130	4.5	7900	1900	13	3300	120	1.3	720	4.2
61: Q1-90-1	140	4.5	8300	2300	16	1700	140	2.3	850	4.1
62: Q1-90-2	75	2.4	7100	1900	14	1500	120	0.3	650	3.7
63: Q1-90-3	80	3.2	8500	2100	16	3600	120	0.3	610	4.7
64: Q1-90-4	76	2.7	7700	1900	16	3700	130	0.2	630	3.7
65: Q1-90-5	77	2.2	7100	1800	14	2000	120	0.3	600	3.3
66: Q1-90-6	74	2.0	7200	1800	14	1300	120	0.2	640	3.0
67: Q1-90-7	75	2.1	7300	1800	14	2000	120	0.2	610	3.1

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Aqua regia

LR Report : CA12202-SEP13

Sample ID	Cr µg/g	Cu µg/g	Fe µg/g	K µg/g	Li µg/g	Mg µg/g	Mn µg/g	Mo µg/g	Na µg/g	Ni µg/g
68: Q1-90-8	82	2.3	7600	1800	14	2700	120	0.3	650	3.5
69: MP-80-1	79	2.1	7700	2000	17	1900	130	0.3	650	3.3
70: MP-80-2	78	2.2	7100	1900	16	2000	120	0.3	570	3.2
71: MP-80-3	81	2.2	7600	1600	14	1900	130	0.7	620	3.3
72: MP-80-4	79	2.6	7300	1600	14	6000	120	0.3	570	3.4
73: MP-80-5	76	3.1	7600	1900	15	3000	120	0.2	610	3.3
74: MP-80-6	75	2.3	7700	1900	14	6100	120	1.6	550	3.3
75: MP-80-7	120	3.1	7900	2200	16	1500	130	1.5	780	3.2
76: MP-80-8	100	3.4	7300	2100	12	24000	130	0.6	580	3.9
77: MS-CP-1	160	14	15000	2600	10	9000	140	2.0	480	43
78: MS-CP-2	160	13	15000	3000	10	7300	120	0.9	550	13
79: MS-CP-3	170	19	21000	5400	13	15000	170	1.9	550	35
80: MS-CP-4	170	16	17000	3200	13	14000	140	0.9	480	30
81: MS-CP-5	150	17	17000	4000	11	8000	140	1.9	590	10.0
82: MS-CP-6	160	13	17000	3800	12	9200	150	0.9	540	16
83: MS-CP-7	120	8.1	9000	1300	5	15000	100	0.4	220	34
84: MS-CP-8	91	20	24000	3900	25	19000	160	0.4	590	15
85: MS-CP-9	97	13	14000	3100	11	8700	140	0.5	540	17
86: MS-CP-10	94	14	17000	3900	13	9200	140	0.5	440	21
87: MS-CP-11	100	13	19000	3000	13	8900	140	0.5	380	14
88: MS-CP-12	100	12	13000	3100	10	17000	140	0.6	360	28
89: MS-CP-13	110	12	13000	2200	9	8600	120	0.5	390	26
90: MS-CP-14	99	15	15000	2200	10	7700	110	0.4	460	21
91: MS-CP-15	99	18	19000	3600	13	9400	150	0.7	500	27
92: MS-CP-16	97	13	17000	4000	13	14000	150	0.4	490	22
93: MS-CP-17	120	20	24000	4200	24	18000	160	1.5	630	13
94: MS-CP-18	130	16	22000	4300	19	15000	150	0.8	640	12
95: MS-CP-19	120	26	25000	4100	26	20000	170	1.4	590	15
96: MS-CP-20	120	24	27000	4500	28	20000	160	0.7	570	15
97: MS-CP-21	150	22	24000	3500	27	19000	160	1.6	580	18
98: MS-CP-22	120	20	23000	5000	24	18000	160	0.8	580	14
99: MS-CP-23	140	27	31000	4900	35	28000	190	1.4	600	24
100: MS-CP-24	140	17	23000	3700	23	18000	140	0.8	550	15
101: MS-Q104-1	130	13	8500	2100	7	4600	64	1.6	440	5.0
102: MS-Q104-2	150	24	16000	2700	16	12000	120	0.8	560	11
103: MS-Q104-3	150	12	17000	4300	15	9400	130	1.8	540	9.4
104: MS-Q104-4	130	12	8000	2300	8	3900	67	0.7	690	6.0
105: MS-Q104-5	140	22	22000	2600	21	14000	120	1.8	460	11
106: MS-Q104-6	180	17	18000	2400	14	13000	130	0.9	320	23
107: MS-Q104-7	150	23	26000	4300	29	23000	180	1.6	560	20
108: MS-Q104-8	160	9.6	7700	1900	5	3300	81	0.8	500	7.3

OnLine LIMS

0000033052

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Aqua regia

Baffinland Iron Mines Corp
Attn : Jim Millard

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Canada, L6H 0C3
Phone: 416-364-8820, Fax:416-364-0193

07-October-2013

Date Rec. : 06 September 2013
LR Report: **CA12202-SEP13**
Reference: Mary River Project Quarry Testing

Copy: #1

CERTIFICATE OF ANALYSIS
Final Report

Sample ID	Pb µg/g	S µg/g	Sb µg/g	Se µg/g	Sn µg/g	Sr µg/g	Ti µg/g	Tl µg/g	U µg/g	V µg/g	Zn µg/g
3: Analysis Approval Date	30-Sep-13	07-Oct-13	30-Sep-13	30-Sep-13	30-Sep-13	30-Sep-13	30-Sep-13	30-Sep-13	30-Sep-13	30-Sep-13	30-Sep-13
4: Analysis Approval Time	11:13	11:47	11:13	11:13	11:13	11:13	11:13	11:13	11:13	11:13	11:13
5: Q1-10-1	4.1	130	< 0.8	< 0.7	< 0.5	7.1	110	0.07	3.2	3	15
6: Q1-10-2	4.1	220	< 0.8	< 0.7	< 0.5	7.1	96	0.06	3.1	2	12
7: Q1-10-3	4.0	130	< 0.8	< 0.7	< 0.5	7.5	170	0.10	3.6	4	15
8: Q1-10-4	3.9	150	< 0.8	< 0.7	< 0.5	7.6	130	0.07	3.1	2	14
9: Q1-10-5	3.4	160	< 0.8	< 0.7	< 0.5	7.7	120	0.08	2.5	3	14
10: Q1-10-6	3.4	170	< 0.8	< 0.7	0.6	8.2	390	0.13	2.1	14	19
11: Q1-10-7	4.2	200	< 0.8	< 0.7	< 0.5	8.0	98	0.07	3.0	2	12
12: Q1-10-8	6.1	100	< 0.8	< 0.7	< 0.5	7.0	100	0.07	2.2	2	14
13: Q1-20-1	4.1	130	< 0.8	< 0.7	< 0.5	5.6	100	0.08	1.9	< 1	13
14: Q1-20-2	4.3	160	< 0.8	< 0.7	< 0.5	6.7	100	0.07	3.4	2	13
15: Q1-20-3	4.0	78	< 0.8	< 0.7	< 0.5	5.9	120	0.08	2.4	2	13
16: Q1-20-4	3.7	180	< 0.8	< 0.7	< 0.5	5.6	93	0.07	2.6	1	12
17: Q1-20-5	4.9	< 1	< 0.8	< 0.7	< 0.5	5.9	150	0.10	2.0	1	15
18: Q1-20-6	5.3	12	< 0.8	< 0.7	< 0.5	5.5	150	0.10	3.2	1	15
19: Q1-20-7	4.7	15	< 0.8	< 0.7	< 0.5	7.1	130	0.09	2.1	1	14
20: Q1-20-8	5.2	6	< 0.8	< 0.7	< 0.5	6.7	160	0.09	2.2	1	15
21: Q1-30-1	4.6	100	< 0.8	< 0.7	< 0.5	6.6	120	0.08	2.8	1	14
22: Q1-30-2	5.8	59	< 0.8	< 0.7	< 0.5	6.0	140	0.09	3.2	< 1	15
23: Q1-30-3	5.3	48	< 0.8	< 0.7	< 0.5	5.6	140	0.09	2.9	1	14
24: Q1-30-4	4.6	51	< 0.8	< 0.7	< 0.5	5.4	120	0.08	2.9	< 1	14
25: Q1-30-5	4.0	240	< 0.8	< 0.7	< 0.5	6.9	110	0.07	2.1	2	13
26: Q1-30-6	5.6	54	< 0.8	< 0.7	< 0.5	6.4	160	0.09	2.5	1	15

OnLine LIMS

0000033055

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Aqua regia

LR Report : **CA12202-SEP13**

Sample ID	Pb µg/g	S µg/g	Sb µg/g	Se µg/g	Sn µg/g	Sr µg/g	Ti µg/g	Tl µg/g	U µg/g	V µg/g	Zn µg/g
27: Q1-30-7	4.6	74	< 0.8	< 0.7	< 0.5	5.5	110	0.07	3.0	1	14
28: Q1-30-8	4.3	92	< 0.8	< 0.7	< 0.5	4.8	120	0.08	2.3	1	14
29: Q1-40-1	4.2	55	< 0.8	< 0.7	< 0.5	5.2	120	0.08	2.7	1	14
30: Q1-40-2	6.0	37	< 0.8	< 0.7	< 0.5	5.7	140	0.10	3.8	1	15
31: Q1-40-3	4.7	71	< 0.8	< 0.7	< 0.5	5.6	140	0.09	2.9	1	14
32: Q1-40-4	3.9	44	< 0.8	< 0.7	< 0.5	5.4	130	0.09	2.4	1	14
33: Q1-40-5	5.4	43	< 0.8	< 0.7	< 0.5	6.2	140	0.10	3.2	2	15
34: Q1-40-6	6.3	31	< 0.8	< 0.7	< 0.5	9.3	140	0.11	3.2	< 1	14
35: Q1-40-7	4.8	43	< 0.8	< 0.7	< 0.5	8.3	130	0.11	2.9	1	17
36: Q1-40-8	5.1	55	< 0.8	< 0.7	< 0.5	8.3	130	0.10	3.1	< 1	14
37: Q1-50-1	6.1	52	< 0.8	< 0.7	< 0.5	8.5	150	0.12	3.4	< 1	18
38: Q1-50-2	5.0	51	< 0.8	< 0.7	< 0.5	6.9	130	0.10	2.9	< 1	14
39: Q1-50-3	5.7	90	< 0.8	< 0.7	< 0.5	7.2	130	0.10	5.0	< 1	18
40: Q1-50-4	4.9	93	< 0.8	< 0.7	< 0.5	6.2	120	0.09	3.3	< 1	15
41: Q1-50-5	4.7	100	< 0.8	< 0.7	< 0.5	6.5	120	0.09	3.1	< 1	14
42: Q1-50-6	4.7	67	< 0.8	< 0.7	< 0.5	6.0	130	0.09	3.1	< 1	15
43: Q1-50-7	4.6	49	< 0.8	< 0.7	< 0.5	7.2	120	0.09	2.5	< 1	14
44: Q1-50-8	4.9	160	< 0.8	< 0.7	< 0.5	5.9	120	0.09	3.5	< 1	14
45: Q1-60-1	4.9	9	< 0.8	< 0.7	< 0.5	12	210	0.13	1.8	1	15
46: Q1-60-2	4.6	110	< 0.8	< 0.7	< 0.5	7.4	130	0.10	2.5	1	15
47: Q1-60-3	5.4	130	< 0.8	< 0.7	< 0.5	6.7	110	0.09	2.6	< 1	15
48: Q1-60-4	4.5	67	< 0.8	< 0.7	< 0.5	7.3	110	0.09	2.4	< 1	15
49: Q1-60-5	4.3	22	< 0.8	< 0.7	< 0.5	6.3	140	0.10	2.2	< 1	15
50: Q1-60-6	3.6	50	< 0.8	< 0.7	< 0.5	6.3	84	0.07	1.9	1	13
51: Q1-60-7	5.4	42	< 0.8	< 0.7	< 0.5	9.6	150	0.11	2.0	< 1	16
52: Q1-60-8	5.1	16	< 0.8	< 0.7	< 0.5	8.6	180	0.11	1.9	1	14
53: Q1-70-1	4.5	94	< 0.8	< 0.7	< 0.5	7.0	91	0.08	2.1	< 1	14
54: Q1-70-2	3.7	130	< 0.8	< 0.7	< 0.5	5.2	120	0.09	1.7	2	14
55: Q1-70-3	4.7	79	< 0.8	< 0.7	< 0.5	8.6	150	0.10	2.5	2	15
56: Q1-70-4	3.6	270	< 0.8	< 0.7	< 0.5	6.1	71	0.07	3.0	< 1	16
57: Q1-70-5	5.1	150	< 0.8	< 0.7	< 0.5	6.8	160	0.12	3.2	1	17
58: Q1-70-6	5.5	240	< 0.8	< 0.7	< 0.5	7.6	99	0.08	3.4	< 1	14
59: Q1-70-7	4.5	69	< 0.8	< 0.7	< 0.5	6.8	95	0.08	2.6	< 1	14
60: Q1-70-8	4.5	160	< 0.8	< 0.7	< 0.5	8.2	100	0.08	2.4	< 1	14
61: Q1-90-1	6.4	49	< 0.8	< 0.7	< 0.5	7.9	170	0.12	3.5	< 1	17
62: Q1-90-2	6.0	30	< 0.8	< 0.7	< 0.5	6.2	150	0.10	3.3	1	15
63: Q1-90-3	5.1	33	< 0.8	< 0.7	< 0.5	7.0	210	0.11	2.7	4	17
64: Q1-90-4	5.2	59	< 0.8	< 0.7	< 0.5	7.3	150	0.09	3.1	1	15
65: Q1-90-5	5.4	44	< 0.8	< 0.7	< 0.5	6.0	130	0.09	3.1	2	14
66: Q1-90-6	4.9	< 1	< 0.8	< 0.7	< 0.5	5.8	140	0.09	2.8	< 1	15
67: Q1-90-7	5.0	26	< 0.8	< 0.7	< 0.5	5.9	130	0.08	3.2	1	15

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Sample ID	Pb µg/g	S µg/g	Sb µg/g	Se µg/g	Sn µg/g	Sr µg/g	Ti µg/g	Tl µg/g	U µg/g	V µg/g	Zn µg/g
68: Q1-90-8	4.6	39	< 0.8	< 0.7	< 0.5	8.2	140	0.08	2.4	2	15
69: MP-80-1	5.2	74	< 0.8	< 0.7	< 0.5	7.3	170	0.11	2.8	2	15
70: MP-80-2	5.1	100	< 0.8	< 0.7	< 0.5	6.6	160	0.10	3.2	2	15
71: MP-80-3	5.3	30	< 0.8	< 0.7	< 0.5	5.9	99	0.07	2.5	2	15
72: MP-80-4	4.5	69	< 0.8	< 0.7	< 0.5	8.9	110	0.07	2.5	1	15
73: MP-80-5	5.0	70	< 0.8	< 0.7	< 0.5	8.3	160	0.09	3.1	2	15
74: MP-80-6	4.8	41	< 0.8	< 0.7	< 0.5	8.4	150	0.09	3.0	2	15
75: MP-80-7	5.6	71	< 0.8	< 0.7	< 0.5	7.2	160	0.12	3.4	< 1	14
76: MP-80-8	4.1	60	< 0.8	< 0.7	< 0.5	20	140	0.07	1.8	2	13
77: MS-CP-1	10	16	< 0.8	< 0.7	0.8	4.4	270	0.12	5.7	12	26
78: MS-CP-2	7.4	49	< 0.8	< 0.7	1.2	3.3	250	0.13	6.3	12	25
79: MS-CP-3	9.8	79	< 0.8	< 0.7	1.3	3.0	450	0.31	6.6	27	34
80: MS-CP-4	8.1	97	< 0.8	< 0.7	0.8	4.4	290	0.15	5.2	21	24
81: MS-CP-5	9.8	210	< 0.8	< 0.7	1.2	2.2	310	0.19	7.6	19	29
82: MS-CP-6	8.5	79	< 0.8	< 0.7	0.9	3.8	340	0.19	6.0	19	29
83: MS-CP-7	3.9	15	< 0.8	< 0.7	< 0.5	8.1	180	0.05	0.59	6	9.4
84: MS-CP-8	9.1	98	< 0.8	< 0.7	0.8	2.5	280	0.20	8.1	41	32
85: MS-CP-9	14	26	< 0.8	< 0.7	1.1	3.0	220	0.16	6.7	15	32
86: MS-CP-10	8.9	250	< 0.8	< 0.7	0.7	3.0	370	0.20	5.9	25	29
87: MS-CP-11	7.2	85	< 0.8	< 0.7	< 0.5	4.6	370	0.15	3.7	22	23
88: MS-CP-12	6.6	93	< 0.8	< 0.7	< 0.5	8.5	350	0.13	7.4	13	20
89: MS-CP-13	7.6	26	< 0.8	< 0.7	0.6	4.8	240	0.10	3.3	12	21
90: MS-CP-14	9.1	28	< 0.8	< 0.7	0.9	3.1	190	0.10	5.0	12	22
91: MS-CP-15	15	120	< 0.8	< 0.7	1.5	3.2	270	0.22	7.1	14	38
92: MS-CP-16	7.7	33	< 0.8	< 0.7	0.8	4.2	330	0.20	5.5	25	26
93: MS-CP-17	9.9	120	< 0.8	< 0.7	0.8	2.4	270	0.21	8.7	37	31
94: MS-CP-18	8.9	46	< 0.8	< 0.7	0.8	2.2	290	0.22	8.5	33	31
95: MS-CP-19	8.9	84	< 0.8	< 0.7	0.8	2.6	270	0.21	8.5	40	33
96: MS-CP-20	8.1	150	< 0.8	< 0.7	0.8	2.3	340	0.22	8.3	50	30
97: MS-CP-21	9.1	100	< 0.8	< 0.7	0.9	2.5	230	0.19	9.2	38	31
98: MS-CP-22	10.0	160	< 0.8	< 0.7	1.0	2.3	350	0.27	8.6	36	34
99: MS-CP-23	7.9	190	< 0.8	< 0.7	0.9	2.5	330	0.25	7.6	51	34
100: MS-CP-24	8.7	120	< 0.8	< 0.7	0.7	2.0	220	0.17	7.2	37	31
101: MS-Q104-1	15	61	< 0.8	< 0.7	0.7	2.0	41	0.04	8.4	3	37
102: MS-Q104-2	8.8	160	< 0.8	< 0.7	0.9	1.9	130	0.11	12	18	29
103: MS-Q104-3	9.8	86	< 0.8	< 0.7	0.6	1.8	260	0.24	10	19	30
104: MS-Q104-4	6.8	64	< 0.8	< 0.7	< 0.5	2.9	37	0.06	4.6	< 1	20
105: MS-Q104-5	7.2	340	< 0.8	< 0.7	0.7	2.2	190	0.09	8.8	39	19
106: MS-Q104-6	7.2	170	< 0.8	< 0.7	< 0.5	5.1	220	0.09	4.1	21	23
107: MS-Q104-7	8.5	58	< 0.8	< 0.7	0.8	2.5	310	0.21	8.5	43	34
108: MS-Q104-8	9.0	54	< 0.8	1.0	0.5	1.9	72	0.04	7.2	1	28

OnLine LIMS

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OnLine LIMS

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Modified ABA

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04-October-2013

Baffinland Iron Mines Corp
Attn : Jim Millard

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Phone: 416-364-8820, Fax:416-364-0193

Date Rec. : 12 September 2013
LR Report: **CA12310-SEP13**
Reference: Mary River Project Quarry Testing

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CERTIFICATE OF ANALYSIS

Final Report

Analysis	3: Analysis Approval Date	4: Analysis Approval Time	5: Q1-110-1	6: Q1-110-2	7: Q1-110-3	8: Q1-110-4	9: Q1-110-5	10: Q1-110-6	11: Q1-110-7	12: Q1-110-8
Sample Date & Time			18-Aug-13	18-Aug-13	18-Aug-13	18-Aug-13	18-Aug-13	18-Aug-13	18-Aug-13	18-Aug-13
Paste pH [units]	28-Sep-13	11:36	7.69	9.33	9.35	9.52	9.46	9.37	9.39	9.53
Fizz Rate [---]	28-Sep-13	11:36	2	2	2	2	2	2	2	2
Sample weight [g]	28-Sep-13	11:36	2.05	1.99	2.01	2.02	2.03	1.96	2.01	1.99
HCl added [mL]	28-Sep-13	11:36	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
HCl [Normality]	28-Sep-13	11:36	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
NaOH [Normality]	28-Sep-13	11:36	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
NaOH to pH=8.3 [mL]	28-Sep-13	11:36	17.66	10.08	16.64	17.91	17.68	27.12	15.94	17.85
Final pH [units]	28-Sep-13	11:36	1.09	1.37	1.12	1.14	1.11	1.23	1.17	1.09
NP [t CaCO3/1000 t]	28-Sep-13	11:36	5.7	25	8.4	5.2	5.7	-18	10	5.4
AP [t CaCO3/1000 t]	---	---	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31
Net NP [t CaCO3/1000 t]	---	---	5.39	24.6	8.09	4.89	5.39	-18.5	9.79	5.09
NP/AP [ratio]	---	---	18.4	80.3	27.1	16.8	18.4	-58.7	32.6	17.4
Sulphur (total) [%]	02-Oct-13	13:49	0.006	0.006	0.006	< 0.005	0.006	0.009	0.009	0.005
Acid Leachable SO4-S [%]	---	---	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Sulphide [%]	04-Oct-13	12:00	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Carbon (total) [%]	02-Oct-13	13:49	0.104	0.316	0.097	0.039	0.056	0.187	0.115	0.042
Carbonate [%]	03-Oct-13	13:01	0.170	1.22	0.290	0.095	0.150	0.679	0.365	0.135

OnLine LIMS

000032014

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*NP (Neutralization Potential)
 = 50 x (N of HCL x Total HCL added - N NaOH x NaOH added)
   ------------------------------------------------------
                        Weight of Sample
```

*AP (Acid Potential) = % Sulphide Sulphur x 31.25
*Net NP (Net Neutralization Potential) = NP-AP
NP/AP Ratio = NP/AP
*Results expressed as tonnes CaCO3 equivalent/1000 tonnes of material
Samples with a % Sulphide value of <0.01 will be calculated using a 0.01 value.

Sulphur analysis performed following BC ARD Guidelines (Price 1997)

Brian Graham B.Sc.
Project Specialist
Environmental Services, Analytical

OnLine LIMS

0000032014

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Aqua regia

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03-October-2013

Date Rec. : 12 September 2013
LR Report: **CA12311-SEP13**
Reference: Mary River Project Quarry Testing

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CERTIFICATE OF ANALYSIS
Final Report

Analysis	**3: Analysis Approval Date**	**4: Analysis Approval Time**	**5: Q1-110-1**	**6: Q1-110-2**	**7: Q1-110-3**	**8: Q1-110-4**	**9: Q1-110-5**	**10: Q1-110-6**	**11: Q1-110-7**	**12: Q1-110-8**
Sample Date & Time			18-Aug-13	18-Aug-13	18-Aug-13	18-Aug-13	18-Aug-13	18-Aug-13	18-Aug-13	18-Aug-13
Mercury [µg/g]	25-Sep-13	17:58	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aluminum [µg/g]	02-Oct-13	14:54	3300	3700	3600	5500	3500	3800	3600	3300
Arsenic [µg/g]	23-Sep-13	15:45	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Barium [µg/g]	23-Sep-13	15:45	15	15	15	28	15	16	14	16
Beryllium [µg/g]	23-Sep-13	15:45	0.15	0.14	0.16	0.20	0.13	0.17	0.15	0.12
Bismuth [µg/g]	23-Sep-13	15:45	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09
Calcium [µg/g]	02-Oct-13	14:54	1400	6100	2400	1400	1700	5500	3000	1300
Cadmium [µg/g]	23-Sep-13	15:45	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Cobalt [µg/g]	23-Sep-13	15:45	0.99	1.1	1.0	1.9	1.00	1.1	0.99	1.0
Chromium [µg/g]	23-Sep-13	15:45	39	40	45	38	38	39	40	37
Copper [µg/g]	23-Sep-13	15:45	3.9	3.3	2.9	4.5	2.5	3.4	3.3	2.4
Iron [µg/g]	02-Oct-13	14:54	6700	7700	7700	11000	7700	7900	7300	7000
Potassium [µg/g]	02-Oct-13	14:54	1200	1500	1600	2700	1400	1600	1300	1400
Lithium [µg/g]	23-Sep-13	15:45	17	19	19	23	17	19	19	19
Magnesium [µg/g]	02-Oct-13	14:54	1700	4500	1900	3300	1600	2300	2300	1500
Manganese [µg/g]	23-Sep-13	15:45	140	150	140	200	140	140	140	140
Molybdenum [µg/g]	23-Sep-13	15:45	1.2	1.1	1.2	1.1	1.1	7.8	1.2	1.2
Sodium [µg/g]	02-Oct-13	14:54	370	370	370	370	370	360	330	340

OnLine LIMS

0000030313

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Aqua regia

LR Report : **CA12311-SEP13**

Analysis	3: Analysis Approval Date	4: Analysis Approval Time	5: Q1-110-1	6: Q1-110-2	7: Q1-110-3	8: Q1-110-4	9: Q1-110-5	10: Q1-110-6	11: Q1-110-7	12: Q1-110-8
Nickel [µg/g]	23-Sep-13	15:45	5.3	5.4	5.4	5.8	4.7	5.0	5.0	4.8
Lead [µg/g]	23-Sep-13	15:45	4.2	4.2	5.0	4.8	4.4	4.9	5.4	5.0
Sulphur [µg/g]	02-Oct-13	14:54	110	190	150	140	140	240	190	90
Antimony [µg/g]	23-Sep-13	15:45	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Selenium [µg/g]	23-Sep-13	15:45	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7
Tin [µg/g]	23-Sep-13	15:45	< 0.5	< 0.5	< 0.5	0.7	< 0.5	< 0.5	< 0.5	< 0.5
Strontium [µg/g]	23-Sep-13	15:45	8.6	8.7	7.8	9.4	7.4	11	8.4	7.0
Titanium [µg/g]	23-Sep-13	15:45	130	160	190	340	160	190	150	160
Thallium [µg/g]	23-Sep-13	15:45	0.08	0.10	0.12	0.21	0.10	0.10	0.10	0.10
Uranium [µg/g]	23-Sep-13	15:45	3.0	2.2	3.9	5.3	2.5	3.3	4.1	2.9
Vanadium [µg/g]	23-Sep-13	15:45	3	3	3	7	3	3	3	2
Zinc [µg/g]	23-Sep-13	15:45	16	17	17	22	16	17	15	17

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Modified ABA

Baffinland Iron Mines Corp
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04-October-2013

Date Rec. : 12 September 2013
LR Report: **CA12313-SEP13**
Reference: Mary River Project Quarry Testing

Copy: #1

CERTIFICATE OF ANALYSIS

Final Report

Analysis	3: Analysis Approval Date	4: Analysis Approval Time	5: Q1-100-1	6: Q1-100-2	7: Q1-100-3	8: Q1-100-4	9: Q1-100-5	10: Q1-100-6	11: Q1-100-7	12: Q1-100-8
Sample Date & Time			15-Aug-13	15-Aug-13	15-Aug-13	15-Aug-13	15-Aug-13	15-Aug-13	15-Aug-13	15-Aug-13
Paste pH [units]	04-Oct-13	12:31	9.54	9.42	9.52	9.41	9.28	9.36	9.48	9.29
Fizz Rate [---]	04-Oct-13	12:31	2	2	2	2	2	2	2	2
Sample weight [g]	04-Oct-13	12:31	1.99	2.01	2.04	2.06	1.96	1.99	1.96	1.99
HCl added [mL]	04-Oct-13	12:31	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
HCl [Normality]	04-Oct-13	12:31	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
NaOH [Normality]	04-Oct-13	12:31	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
NaOH to pH=8.3 [mL]	04-Oct-13	12:31	16.62	16.88	16.91	16.05	15.09	15.61	14.65	13.63
Final pH [units]	04-Oct-13	12:31	1.11	1.15	1.16	1.18	1.16	1.17	1.22	1.25
NP [t CaCO3/1000 t]	04-Oct-13	12:31	8.5	7.7	7.6	9.6	12	11	14	16
AP [t CaCO3/1000 t]	---	---	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31
Net NP [t CaCO3/1000 t]	---	---	8.19	7.39	7.29	9.29	12.2	10.7	13.4	15.7
NP/AP [ratio]	---	---	27.4	24.8	24.5	31.0	40.3	35.5	44.2	51.6
Sulphur (total) [%]	02-Oct-13	13:49	< 0.005	0.009	< 0.005	0.006	0.008	0.008	0.007	0.008
Acid Leachable SO4-S [%]	---	---	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Sulphide [%]	04-Oct-13	12:02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Carbon (total) [%]	02-Oct-13	13:49	0.062	0.055	0.056	0.087	0.127	0.107	0.142	0.186
Carbonate [%]	03-Oct-13	13:01	0.160	0.145	0.150	0.225	0.380	0.295	0.400	0.580

OnLine LIMS

0000032018

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```
*NP (Neutralization Potential)
 = 50 x (N of HCL x Total HCL added - N NaOH x NaOH added)
   -------------------------------------------------------
                        Weight of Sample
```

*AP (Acid Potential) = % Sulphide Sulphur x 31.25
*Net NP (Net Neutralization Potential) = NP-AP
NP/AP Ratio = NP/AP
*Results expressed as tonnes CaCO3 equivalent/1000 tonnes of material
Samples with a % Sulphide value of <0.01 will be calculated using a 0.01 value.

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OnLine LIMS

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Aqua regia

03-October-2013

Baffinland Iron Mines Corp
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Phone: 416-364-8820, Fax:416-364-0193

Date Rec. : 12 September 2013
LR Report: **CA12314-SEP13**
Reference: Mary River Project Quarry Testing

Copy: #1

CERTIFICATE OF ANALYSIS

Final Report

Analysis	**3: Analysis Approval Date**	**4: Analysis Approval Time**	**5: Q1-100-1**	**6: Q1-100-2**	**7: Q1-100-3**	**8: Q1-100-4**	**9: Q1-100-5**	**10: Q1-100-6**	**11: Q1-100-7**	**12: Q1-100-8**
Sample Date & Time			15-Aug-13	15-Aug-13	15-Aug-13	15-Aug-13	15-Aug-13	15-Aug-13	15-Aug-13	15-Aug-13
Mercury [µg/g]	25-Sep-13	17:58	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aluminum [µg/g]	02-Oct-13	14:55	3600	3800	3600	3300	4100	3900	3200	3300
Arsenic [µg/g]	23-Sep-13	15:46	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.6	0.8
Barium [µg/g]	23-Sep-13	15:46	14	12	20	17	13	15	14	16
Beryllium [µg/g]	23-Sep-13	15:46	0.14	0.17	0.13	0.14	0.24	0.18	0.15	0.17
Bismuth [µg/g]	23-Sep-13	15:46	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09
Calcium [µg/g]	02-Oct-13	14:55	1700	1700	1600	2100	3400	2700	3300	3900
Cadmium [µg/g]	23-Sep-13	15:46	< 0.02	< 0.02	< 0.02	< 0.02	0.02	< 0.02	< 0.02	< 0.02
Cobalt [µg/g]	23-Sep-13	15:46	1.0	1.2	1.1	1.0	1.2	1.1	1.1	1.1
Chromium [µg/g]	23-Sep-13	15:46	43	37	45	40	37	37	43	44
Copper [µg/g]	23-Sep-13	15:46	8.2	7.3	6.3	5.1	4.2	10	160	23
Iron [µg/g]	02-Oct-13	14:55	7400	7300	7500	7100	8300	7900	7000	6900
Potassium [µg/g]	02-Oct-13	14:55	1300	1200	1500	1400	1200	1400	1300	1300
Lithium [µg/g]	23-Sep-13	15:46	20	16	18	16	18	17	16	16
Magnesium [µg/g]	02-Oct-13	14:55	2000	2100	1800	2000	3000	2500	2400	2800
Manganese [µg/g]	23-Sep-13	15:46	150	130	150	130	150	140	150	130
Molybdenum [µg/g]	23-Sep-13	15:46	1.2	1.2	1.2	1.3	1.1	1.6	1.5	1.9
Sodium [µg/g]	02-Oct-13	14:55	360	330	370	370	340	340	380	350

OnLine LIMS

0000003229

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Aqua regia

LR Report : **CA12314-SEP13**

Analysis	3: Analysis Approval Date	4: Analysis Approval Time	5: Q1-100-1	6: Q1-100-2	7: Q1-100-3	8: Q1-100-4	9: Q1-100-5	10: Q1-100-6	11: Q1-100-7	12: Q1-100-8
Nickel [µg/g]	23-Sep-13	15:46	5.2	4.8	5.9	5.3	5.0	4.7	7.3	5.9
Lead [µg/g]	23-Sep-13	15:46	4.9	3.9	4.7	4.8	3.9	4.6	5.0	4.3
Sulphur [µg/g]	02-Oct-13	14:55	110	190	130	170	240	180	210	210
Antimony [µg/g]	23-Sep-13	15:46	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Selenium [µg/g]	23-Sep-13	15:46	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7
Tin [µg/g]	23-Sep-13	15:46	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Strontium [µg/g]	23-Sep-13	15:46	8.2	6.5	8.9	8.3	7.9	7.7	8.3	8.5
Titanium [µg/g]	23-Sep-13	15:46	140	110	180	150	110	130	140	110
Thallium [µg/g]	23-Sep-13	15:46	0.08	0.07	0.10	0.09	0.07	0.09	0.08	0.07
Uranium [µg/g]	23-Sep-13	15:46	3.1	5.4	3.6	6.4	3.5	3.7	4.5	3.8
Vanadium [µg/g]	23-Sep-13	15:46	3	3	3	3	3	3	3	2
Zinc [µg/g]	23-Sep-13	15:46	17	14	17	15	17	16	17	15

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OnLine LIMS

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Modified ABA-Sobek

04-October-2013

Baffinland Iron Mines Corp
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Date Rec. : 17 September 2013
LR Report: **CA12435-SEP13**
Reference: Mary River Project Quarry Testing

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CERTIFICATE OF ANALYSIS

Final Report

Analysis	3: Analysis Approval Date	4: Analysis Approval Time	5: Q1-120-01	6: Q1-120-02	7: Q1-120-03	8: Q1-120-04	9: Q1-120-05	10: Q1-120-06	11: Q1-120-07	12: Q1-120-08
Sample Date & Time			26-Aug-13 08:30	26-Aug-13 08:30	26-Aug-13 08:30	26-Aug-13 08:30	26-Aug-13 08:30	26-Aug-13 08:30	26-Aug-13 08:30	26-Aug-13 08:30
Paste pH [units]	04-Oct-13	12:31	9.66	9.74	9.75	9.75	9.73	9.71	9.32	9.67
Fizz Rate [---]	04-Oct-13	12:31	2	2	2	2	2	2	2	2
Sample weight [g]	04-Oct-13	12:31	1.98	1.97	1.96	2.04	2.00	2.01	2.00	1.99
HCl added [mL]	04-Oct-13	12:31	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
HCl [Normality]	04-Oct-13	12:31	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
NaOH [Normality]	04-Oct-13	12:31	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
NaOH to pH=8.3 [mL]	04-Oct-13	12:31	16.19	13.86	17.21	17.59	17.90	17.48	17.33	17.50
Final pH [units]	04-Oct-13	12:31	1.18	1.19	1.09	1.10	1.11	1.11	1.10	1.12
NP [t CaCO3/1000 t]	04-Oct-13	12:31	9.6	16	7.1	5.9	5.2	6.3	6.7	6.3
AP [t CaCO3/1000 t]	---	---	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31
Net NP [t CaCO3/1000 t]	---	---	9.29	15.3	6.79	5.59	4.89	5.99	6.39	5.99
NP/AP [ratio]	---	---	31.0	50.3	22.9	19.0	16.8	20.3	21.6	20.3
Sulphur (total) [%]	02-Oct-13	13:50	0.012	0.007	0.005	< 0.005	0.005	0.005	0.005	< 0.005
Acid Leachable SO4-S [%]	---	---	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Sulphide [%]	04-Oct-13	12:32	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.01
Carbon (total) [%]	02-Oct-13	13:50	0.073	0.149	0.043	0.028	0.026	0.031	0.039	0.032
Carbonate [%]	03-Oct-13	13:01	0.120	0.565	0.090	0.040	0.065	0.070	0.100	0.080

OnLine LIMS

0000032073

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Aqua regia

03-October-2013

Baffinland Iron Mines Corp
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Date Rec. : 17 September 2013
LR Report: **CA12436-SEP13**
Reference: Mary River Project Quarry Testing

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CERTIFICATE OF ANALYSIS

Final Report

Analysis	3: Analysis Approval Date	4: Analysis Approval Time	5: Q1-120-01	6: Q1-120-02	7: Q1-120-03	8: Q1-120-04	9: Q1-120-05	10: Q1-120-06	11: Q1-120-07	12: Q1-120-08
Sample Date & Time			26-Aug-13 08:30	26-Aug-13 08:30	26-Aug-13 08:30	26-Aug-13 08:30	26-Aug-13 08:30	26-Aug-13 08:30	26-Aug-13 08:30	26-Aug-13 08:30
Mercury [µg/g]	25-Sep-13	17:58	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aluminum [µg/g]	03-Oct-13	10:05	3700	3500	3500	3300	3400	3300	3500	3300
Arsenic [µg/g]	23-Sep-13	18:10	1.9	< 0.5	0.7	< 0.5	< 0.5	< 0.5	< 0.5	0.6
Barium [µg/g]	23-Sep-13	18:10	19	20	17	19	19	20	18	22
Beryllium [µg/g]	23-Sep-13	18:10	0.11	0.11	0.13	0.11	0.12	0.11	0.13	0.15
Bismuth [µg/g]	23-Sep-13	18:10	< 0.09	< 0.09	0.10	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09
Calcium [µg/g]	03-Oct-13	10:05	1900	5200	1500	860	850	1100	1300	1200
Cadmium [µg/g]	23-Sep-13	18:11	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Cobalt [µg/g]	23-Sep-13	18:11	1.7	1.3	1.2	1.1	1.2	1.2	1.2	1.2
Chromium [µg/g]	23-Sep-13	18:11	62	61	61	60	57	56	54	62
Copper [µg/g]	23-Sep-13	18:11	5.9	2.1	1.3	1.1	2.0	1.5	1.8	1.5
Iron [µg/g]	03-Oct-13	10:06	7500	7100	7000	6600	6900	6600	7200	6900
Potassium [µg/g]	03-Oct-13	10:06	1500	1500	1400	1400	1400	1400	1400	1400
Lithium [µg/g]	23-Sep-13	18:11	16	16	13	14	14	17	16	16
Magnesium [µg/g]	03-Oct-13	10:06	2600	1500	1500	1200	1300	1200	1500	1200
Manganese [µg/g]	23-Sep-13	18:11	150	150	130	120	120	120	120	120
Molybdenum [µg/g]	23-Sep-13	18:11	1.2	1.1	1.0	1.3	1.2	1.9	1.2	1.2
Sodium [µg/g]	03-Oct-13	10:06	400	460	440	420	440	430	390	440
Nickel [µg/g]	23-Sep-13	18:11	12	5.5	4.1	5.6	5.0	4.7	4.7	5.1
Lead [µg/g]	23-Sep-13	18:11	5.4	5.5	3.9	5.4	5.6	6.2	5.8	7.5
Sulphur [µg/g]	03-Oct-13	10:06	130	160	55	35	64	71	85	83
Antimony [µg/g]	23-Sep-13	18:11	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8

OnLine LIMS

0000303340

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Aqua regia

LR Report : CA12436-SEP13

Analysis	3: Analysis Approval Date	4: Analysis Approval Time	5: Q1-120-01	6: Q1-120-02	7: Q1-120-03	8: Q1-120-04	9: Q1-120-05	10: Q1-120-06	11: Q1-120-07	12: Q1-120-08
Selenium [µg/g]	23-Sep-13	18:11	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7
Tin [µg/g]	23-Sep-13	18:11	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Strontium [µg/g]	23-Sep-13	18:11	9.2	9.3	8.5	7.5	8.8	9.9	10	9.3
Titanium [µg/g]	23-Sep-13	18:11	190	160	130	140	130	150	130	150
Thallium [µg/g]	23-Sep-13	18:11	0.10	0.10	0.08	0.09	0.09	0.10	0.09	0.10
Uranium [µg/g]	23-Sep-13	18:11	6.0	3.4	2.3	3.3	3.2	4.3	4.8	4.5
Vanadium [µg/g]	23-Sep-13	18:11	4	2	3	2	2	2	3	2
Zinc [µg/g]	23-Sep-13	18:11	17	16	14	15	15	15	16	16

Brian Graham B.Sc.
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Environmental Services, Analytical

OnLine LIMS

0000030340

Appendix D

AMEC 2010 Report: Baffinland Mary River Project – Trucking Feasibility Study Interim ML/ARD Assessment of Tote Road Quarry and Borrow Pit Samples Rev 1

APPENDIX 6B-2

TOTE ROAD AGGREGATE SOURCES GEOCHEMISTRY CHARACTERIZATION REPORT

TECHNICAL MEMORANDUM

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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^{o}C and monthly averages below -20^{o}C from December to March. Above freezing temperatures occur only from June to August, with an average high of 4.4^{o}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 Sillurian 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 resistate 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	Acid Potential	CaNP	Maximum Potential Acidity	Ratio NP/AP (NPR)	Ratio NP/MPA	Ratio CaNP/AP
		%	%	%	%	kg $CaCO_3$/t	kg $CaCO_3$/t	kg $CaCO_3$/t	kg $CaCO_3$/t	calculated ratio		
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

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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) calculated ratio	Ratio NP/MPA calculated ratio	Ratio CaNP/AP calculated ratio
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 Lithology	Al	As	Ba	Be	Bi	Ca	Cd	Co	Cr	Cu
		%	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 Lithology	Fe	K	Li	Mg	Mn	Mo	Na	Ni	P	Pb
		%	%	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 Lithology	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
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

	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
All Quarry Pit Rock (gneiss, schist, carbonate rocks)															
Min	0.05	0.50	2.7	0.1	0.09	0.06	0.02	1.1	2.1	2.0	0.16	0.03	2.0	0.12	62
Max	1.30	1.8	110	0.5	0.13	29	0.06	9.9	110	28	2.60	0.72	36	2.80	340
Mean	0.46	0.62	28	0.2	0.09	7.40	0.02	2.9	70	8.1	0.93	0.26	13	0.69	186
Median	0.39	0.50	24	0.2	0.09	0.23	0.02	2.1	85	6.2	0.86	0.17	13	0.54	170
Standard Deviation	0.35	0.29	24	0.1	0.01	12	0.01	2.1	41	5.7	0.62	0.22	9.2	0.66	80
No. of Samples	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
5th Percentile	0.08	0.5	3.1	0.06	0.09	0.07	0.02	1.2	2.2	2.2	0.17	0.03	2.0	0.13	69
25th Percentile	0.15	0.5	5.5	0.12	0.09	0.13	0.02	1.6	51	4.2	0.37	0.05	3.0	0.23	140
75th Percentile	0.63	0.5	35	0.23	0.09	10	0.02	3.6	100	11	1.25	0.39	18	0.94	273
95th Percentile	1.13	1.2	71	0.43	0.09	28	0.04	6.6	110	17	1.90	0.70	30	2.30	305
Gneiss															
Min	0.32	0.5	20	0.13	0.09	0.06	0.02	1.1	75	2.9	0.66	0.11	9.0	0.12	140
Max	1.20	0.5	110	0.49	0.13	0.36	0.1	9.9	110	28	2.60	0.72	36	1.10	320
Mean	0.57	0.5	39	0.22	0.09	0.17	0.02	3.5	96	10	1.21	0.34	18	0.37	198
Median	0.45	0.5	30	0.17	0.09	0.14	0.02	2.5	100	8.5	1.00	0.28	15	0.24	180
Standard Deviation	0.27	0.0	24	0.11	0.01	0.09	0.01	2.5	12	6.2	0.51	0.20	7.7	0.28	60
No. of Samples	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21
5th Percentile	0.33	0.5	21	0.13	0.09	0.07	0.02	1.1	78	3.2	0.71	0.15	10	0.13	140
25th Percentile	0.39	0.5	23	0.15	0.09	0.10	0.02	1.4	87	5.3	0.83	0.17	13	0.16	150
75th Percentile	0.78	0.5	51	0.25	0.09	0.23	0.02	5.2	110	14	1.40	0.49	20	0.50	240
95th Percentile	1.10	0.5	78	0.48	0.10	0.36	0.02	8.0	110	18	1.90	0.71	34	0.93	300
Schist															
Min	0.74	0.5	35	0.2	0.09	0.14	0.02	2.2	67	6.3	1.10	0.50	8.0	0.41	250
Max	1.30	1.1	37	0.4	0.09	0.30	0.03	3.6	70	13	1.80	0.60	17.0	1.00	280
Median	1.10	0.5	36	0.3	0.09	0.18	0.02	3.6	69	8.0	1.60	0.54	12.0	0.74	280
No. of Samples	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3

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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

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
All Quarry Pit Rock (gneiss, sch																
Min	0.10	0.012	2.9	21	0.8	0.8	0.7	270	0.5	3.4	0.001	0.02	0.3	3.0	1.5	2.2
Max	6.8	0.062	25	1090	29.0	0.8	2.2	780	1.2	300	0.19	0.48	13.0	48.0	16	50.0
Mean	0.73	0.038	8.3	245	4.7	0.8	0.9	506	0.6	75.4	0.05	0.14	3.0	11.6	4.9	20.9
Median	0.40	0.047	5.0	150	3.3	0.8	0.7	485	0.5	8.2	0.03	0.10	2.7	6.5	3.9	21.5
Standard Deviation	1.3	0.017	5.8	261	5.1	0.0	0.3	108	0.2	117	0.05	0.14	2.8	11	3.3	14
No. of Samples	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
5th Percentile	0.10	0.014	3.2	27	1.0	0.8	0.7	348	0.5	5.4	0.001	0.02	0.3	3.0	1.8	3.2
25th Percentile	0.10	0.016	3.8	69	1.6	0.8	0.7	440	0.5	6.6	0.002	0.02	0.4	4.0	2.6	6.2
75th Percentile	0.50	0.052	14	263	6.0	0.8	0.9	590	0.5	78	0.06	0.21	4.4	13.3	5.8	29.5
95th Percentile	2.7	0.056	16	753	11.3	0.8	1.6	693	0.9	290	0.15	0.45	6.9	34.8	10.9	46.8
Gneiss																
Min	0.20	0.040	3.2	25	2.0	0.8	0.7	440	0.5	5.6	0.01	0.06	2.1	3.0	2.0	18.0
Max	6.8	0.062	25	1000	29.0	0.8	0.8	780	1.2	17	0.19	0.48	13.0	48.0	16	50.0
Mean	1.1	0.051	6.6	273	6.9	0.8	0.7	544	0.6	8.1	0.07	0.20	4.6	15.8	5.7	29.2
Median	0.40	0.051	4.2	220	5.4	0.8	0.7	520	0.5	6.8	0.06	0.17	4.2	12.0	4.1	27.0
Standard Deviation	1.6	0.005	5.9	248	5.7	0.0	0.0	97	0.2	3.0	0.05	0.14	2.5	13.4	3.8	9.9
No. of Samples	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21
5th Percentile	0.20	0.042	3.4	28	2.5	0.8	0.7	440	0.5	5.6	0.02	0.07	2.5	3.0	2.2	19.0
25th Percentile	0.30	0.049	3.8	92	4.0	0.8	0.7	470	0.5	6.5	0.02	0.09	2.9	5.0	3.4	21.0
75th Percentile	1.1	0.053	5.3	270	7.1	0.8	0.7	600	0.6	8.2	0.09	0.31	4.9	22.0	7.1	34.0
95th Percentile	3.4	0.056	20	670	12.0	0.8	0.7	700	1.2	14	0.17	0.46	9.6	43.0	14.0	49.0
Schist																
Min	0.20	0.031	2.9	120	1.7	0.8	0.9	540	0.5	3.4	0.03	0.2	2.2	6.0	3.9	23.0
Max	0.40	0.033	3.8	260	3.3	0.8	2.2	630	0.5	5.8	0.06	0.2	2.3	7.0	7.4	28.0
Median	0.40	0.033	3.1	120	3.2	0.8	1.5	590	0.5	4.8	0.06	0.2	2.2	6.0	5.2	26
No. of Samples	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3

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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 Materia																
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 Gneiss	10-TR-005 BH10-05 Gneiss	10-TR-009 BH10-06 Gneiss	10-TR-014 BH10-08 Gneiss	10-TR-017 BH10-09 Gneiss	10-TR-019 BH10-12 Gneiss	10-TR-035 BH10-12 Schist
Sample Weight	g				250	250	250	250	250	250	250
Volume mL	D.I. H_2O				750	750	750	750	750	750	750
InitialpH	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	0.051	<0.0005	0.0009	0.0010	<0.0005	0.0011	0.0013	0.0010
Copper (Cu)	mg/L	0.3	0.002-0.004[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

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Table 5 Results of Shake Flask Extraction Test (Continued)

	Units	MMER	CWQG (PAL)	CDWQ	10-TR-024 BH10-13 Sand-stone	10-TR-025 BH10-14 Sandy Carbonate	10-TR-029 BH10-15 Carb-onate	10-TR-033 BH10-16 Carb-onate	S449-10 Sand/ Gravel	S454-10 Sand/ Gravel	S458-10 Sand/ Gravel	S461-10 Sand/ Gravel
Sample Weight	g				250	250	250	250	250	250	250	250
Volume mL	D.I. H_2O				750	750	750	750	750	750	750	750
InitialpH	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	0.002-0.004[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

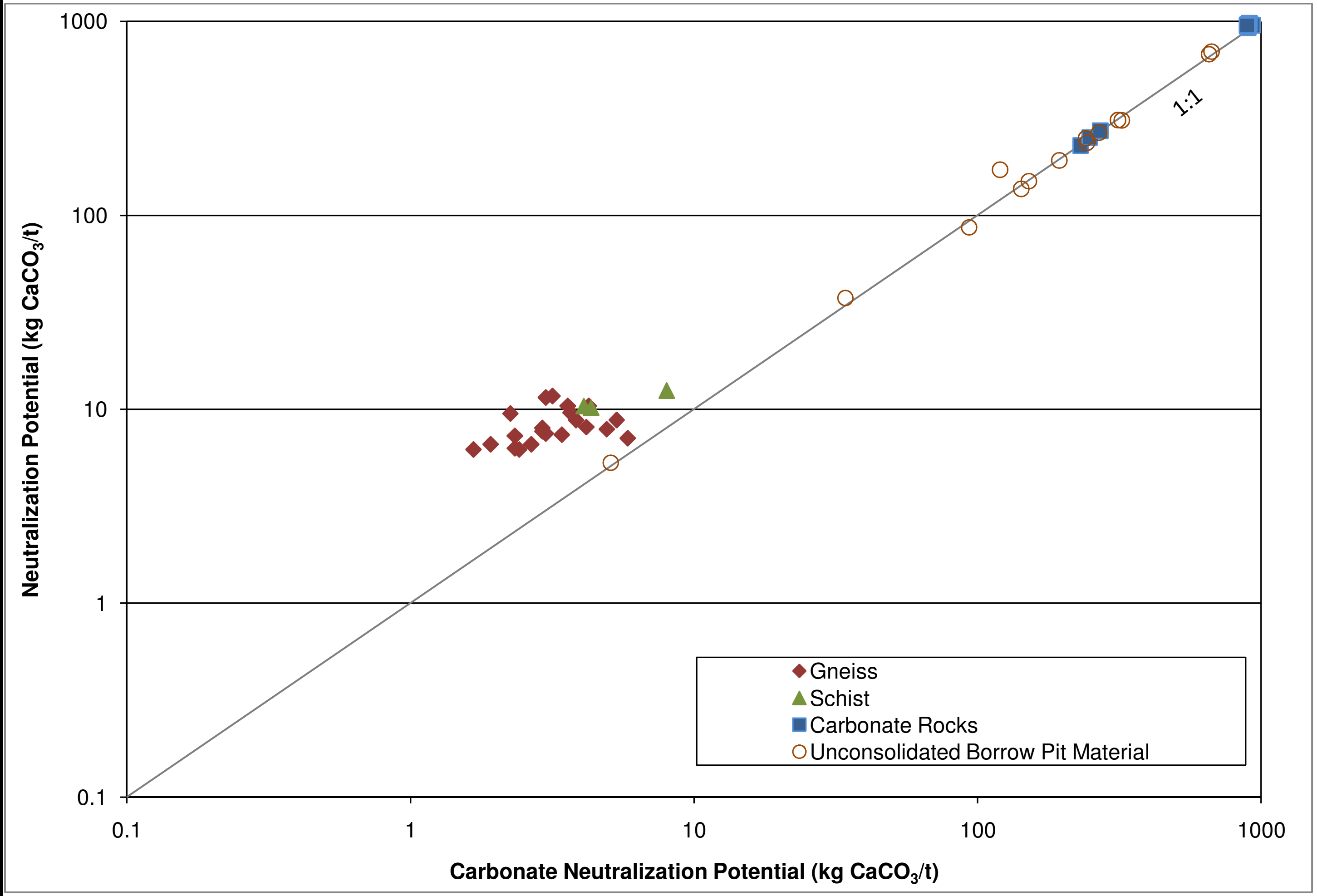
c) Aesthetic objective

Table 6 - Rietveld Quantitative Analysis X-ray Diffraction Results

Mineral/Compound		Ideal Formula	10-TR-001	10-TR-005	10-TR-009	10-TR-014	10-TR-017	10-TR-019	10-TR-035
			BH10-4	BH10-5	BH10-6	BH10-8	BH10-9	BH10-12	BH10-12
			granitic gneiss	*granitic gneiss*	*granitic gneiss*	*granitic gneiss*	*granitic gneiss*	*granitic gneiss*	*schist*
			(wt %)	(wt %)	(wt %)	(wt %)	(wt %)	(wt %)	(wt %)
Calcite	Carbonates	$CaCO_3$	1.2	0.6	0.1	--	0.3	0.2	--
Rhodochrosite	Carbonates	$MnCO_3$	--	--	--	--	--	0.7	--
Dolomite	Carbonates	$CaMg(CO_3)_2$	--	--	--	--	--	0.5	--
Ankerite	Carbonates	$Ca(Mg, Fe)(CO_3)_2$	--	--	--	--	--	--	--
Quartz		SiO_2	34.4	38.1	34.2	33.6	32.5	30.4	42.6
Albite	Feldspars	$NaAlSi_3O_8$	33.4	30.9	35.0	29.7	36.6	27.7	12.4
Anorthite	Feldspars	$CaAl_2Si_2O_8$	4.2	4.7	5.7	7.4	5.4	8.4	5.7
Orthoclase	Feldspars	$KAlSi_3O_8$	2.5	1.8	1.6	4.5	1.8	2.6	4.1
Microcline	Feldspars	$KAlSi_3O_8$	21.8	20.7	16.5	16.8	16.2	10.8	19.5
Diopside (clinopyroxene)		$CaMgSi_2O_6$	--	--	2.9	2.8	3.1	3.0	4.3
Actinolite (amphibole)		$Ca_2(Mg,Fe)_5Si_8O_{22}(OH)_2$	--	--	--	--	--	9.5	--
Phlogopite	Phyllo-silicates	$KMg_3(AlSi_3O_{10})(OH)_2$	0.4	0.8	3.1	4.3	3.1	5.2	3.4
Biotite	Phyllo-silicates	$K(Mg,Fe)_3(AlSi_3O_{10})(OH)_2$	--	--	--	--	--	--	3.9
Clinochlore (chlorite)	Phyllo-silicates	$(Mg, Fe)_5 (Si_3Al)O_{10}(OH)_8$	1.3	1.4	0.01	0.01	0.01	0.9	4.1
Magnetite		Fe_3O_4	0.8	0.9	0.9	0.9	0.9	--	0.1
TOTAL			100	100	100	100	100	100	100

Mineral/Compound		Ideal Formula	10-TR-024	10-TR-025	10-TR-029	10-TR-033	S449-10	S454-10	S458-10	S461-10
			BH10-13	BH10-14	BH10-15	BH10-16				
			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	Carbonates	$MnCO_3$	--	--	--	--	--	--	--	0.6
Dolomite	Carbonates	$CaMg(CO_3)_2$	25.9	0.3	0.3	0.6	46.4	--	6.2	11.5
Ankerite	Carbonates	$Ca(Mg, Fe)(CO_3)_2$	--	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	$NaAlSi_3O_8$	1.2	--	--	--	1.1	0.7	22.7	25.2
Anorthite	Feldspars	$CaAl_2Si_2O_8$	--	--	--	--	--	--	5.1	3.5
Orthoclase	Feldspars	$KAlSi_3O_8$	1.4	--	--	--	1.3	--	3.9	4.1
Microcline	Feldspars	$KAlSi_3O_8$	15.2	--	--	--	4.6	--	18.3	12.8
Diopside (clinopyroxene)		$CaMgSi_2O_6$	--	--	--	--	--	--	2.8	3.1
Actinolite (amphibole)		$Ca_2(Mg,Fe)_5Si_8O_{22}(OH)_2$	--	--	--	--	--	--	--	--
Phlogopite	Phyllo-silicates	$KMg_3(AlSi_3O_{10})(OH)_2$	--	--	--	--	--	--	3.7	3.4
Biotite	Phyllo-silicates	$K(Mg,Fe)_3(AlSi_3O_{10})(OH)_2$	--	--	--	--	--	--	--	--
Clinochlore (chlorite)	Phyllo-silicates	$(Mg, Fe)_5 (Si_3Al)O_{10}(OH)_8$	--	--	--	--	2.6	0.3	0.5	1.6
Magnetite		Fe_3O_4	--	--	--	--	--	--	0.4	0.5
TOTAL			100	100	100	100	100	100	100	100

FIGURES



Aggregate Source Material CaNP vs. NP Milne Inlet Tote Road	
Baffinland Iron Mine Corporation	
December 2010	FIGURE 1

Job No. TC101510

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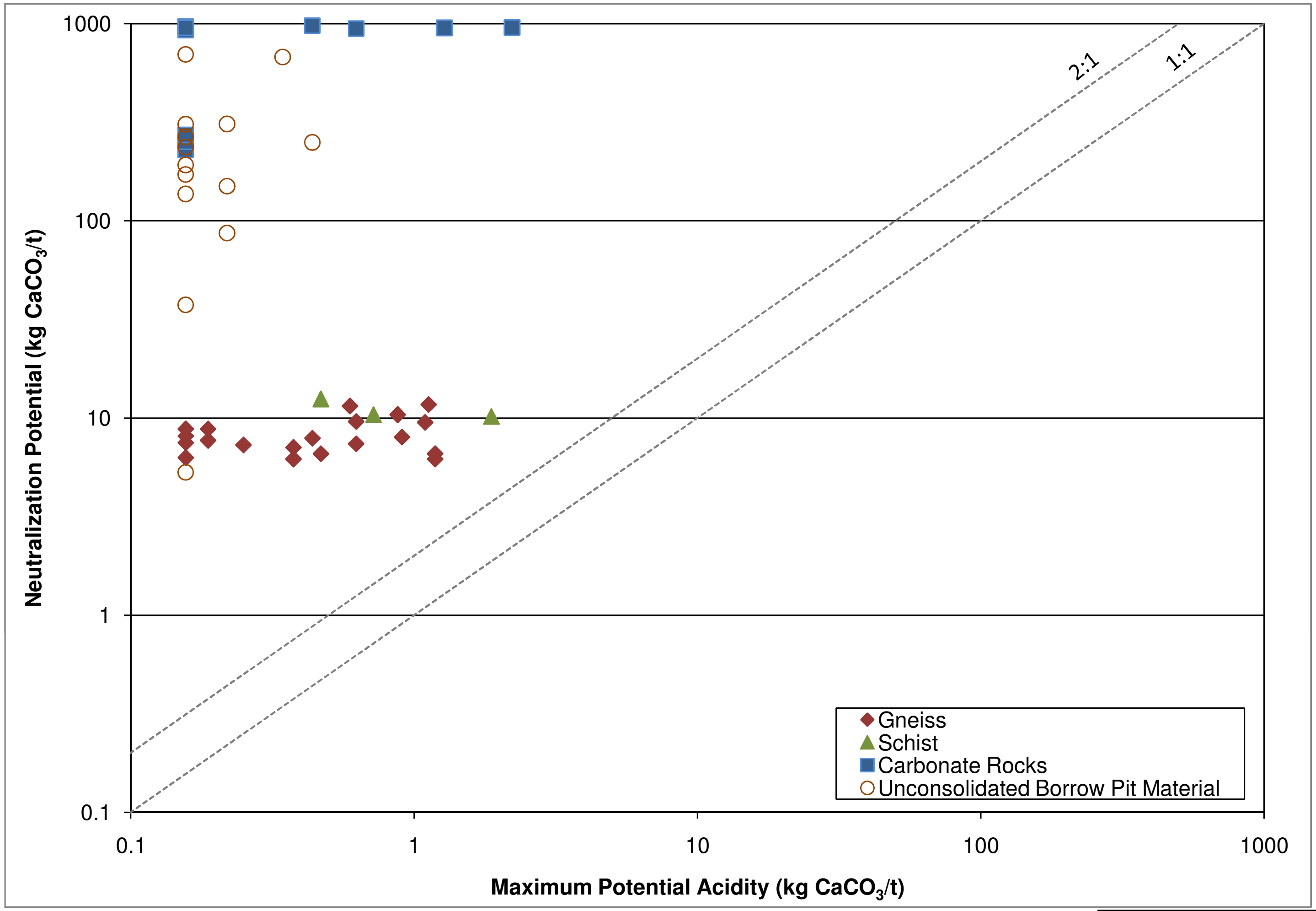

Aggregate Source Material NP vs. MPA Milne Inlet Tote Road	
Baffinland Iron Mine Corporation	
December 2010	FIGURE 2

Job No. TC101510

Baffinland Iron Mines Corporation

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