Kiggavik Project

Environmental Impact Statement

Tier 3 Technical Appendix 6B

Vegetation and Soils Baseline

December 2011

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NON-TECHNICAL OVERVIEW

Plant and soil resources provide habitat for wildlife. Geological history, lay of the land, weather patterns, and other factors result in the development of different soil types, and together all of these physical features create different plant communities. Plants are a food source for important species such as caribou and muskoxen, as well as for small mammals and birds. All of these wildlife species can be prey for larger predators such as wolves, bears and wolverines. Humans are a part of this food web. Local communities have traditional and modern-day uses for many plant species, and are still closely tied to caribou and many other mammals and birds supported by terrestrial habitat. The terrestrial habitat upon which wildlife populations and local communities depend must be well understood and documented because of its important role in the human and environmental setting.

By describing and mapping the terrestrial habitat in and around the Kiggavik Project, a better tool is created for monitoring development. Changes measured in habitat can sometimes help predict and avoid change or potential impact in the wildlife species using that habitat. If changes are observed or measured around the mine, the baseline habitat information will allow comparisons to the larger region to determine whether or not these changes are related to the mine project. If a particular habitat is of high value to caribou or other wildlife species, choices can be made in development plans to lessen or eliminate potential loss of this habitat type. Similarly, if sensitive plant or soil resources are known to be present, and their locations are known, then they can be protected during development. Measuring the amount of chemicals in plants and soils provides a tool for monitoring whether or not chemicals are entering the food chain after the project begins. All of these tools created from the baseline data on plants and soils will help monitor, manage and protect wildlife resources as the Project moves forward.

1 INTRODUCTION

1.1 OVERVIEW

AREVA Resources Canada Inc. (AREVA) has proposed a uranium mine project (the 'Kiggavik Project', or the Project) in the Kivalliq region of Nunavut, in the area around the community of Baker Lake (Figure 1.1-1 and 1.1-2). The Project proposal is for development of a uranium mine and mill complex within the Kiggavik and Sissons Lease areas, and includes open pits, an underground mine, mill facilities, access roads, and other supporting infrastructure. The Kiggavik and Sissons lease area is located approximately 80 km west of Baker Lake

The area around the Kiggavik and Sissons leases has been the subject of exploration and study since the late 1970s by various parties. Following initial feasibility and baseline studies, review of existing information, and the submission of a formal Project Proposal in 2008, AREVA initiated the procedural requirements towards completing the Environmental Impact Statement (EIS). Baseline investigations that began in 2007 in support of the Project Proposal were advanced in 2008, 2009 and 2010 in support of the DEIS.

The objective of this Vegetation and Soils Baseline Report (VSBR) is to provide applicable information on the existing vegetation and soil resources in the immediate and regional areas around AREVA's Kiggavik and Sissons leases, in support of the EIS. The baseline information will be used to assess effects of the Project on the terrestrial environment.

The VSBR summarizes all vegetation and soil data collected during field investigations from 2007 to 2010, and integrates information from historical studies completed in the 1970s and 1980s, as applicable. In doing so and wherever possible, the report presents the current situation for vegetation and soil resources for the local and regional area surrounding the Kiggavik Project. The information presented in this report also provides the basis for ranking wildlife habitat suitability, which is discussed in the Terrestrial Wildlife Baseline Report (see Technical Appendix 6B of this EIS).

This report is organized as follows:

- Section 1 – Introduction;
- Section 2 – Setting;
- Section 3 – Study areas;
- Section 4 – Methods and results for vegetation studies;
- Section 5 – Methods and results for soil studies;

- Section 6 – Summary of key baseline results;
- Section 7 – References cited;
- Section 8 – Glossary of terms; and
- Attachments, including a complete vegetation species list.

1.2 PURPOSE

The purpose of this baseline report is to describe the existing terrestrial vegetation and soil resources that may be affected directly or indirectly by the Project, to provide sufficient information to support the environmental assessment, prepare future resource mitigation and management plans, and develop measures for ongoing environmental monitoring of potential Project-related change.

1.3 SCOPE

In 2007, AREVA began comprehensive surveys to prepare for the environmental assessment and permitting process. The baseline program, which is also part of a long-term monitoring strategy, continued in 2008 through September 2010, and studies are ongoing. Baseline data collection targeted areas around proposed Project facilities (e.g., mine site, road alignments, etc.), and extended to the larger regional area (see Section 3). As outlined in Section 4 and 5, the baseline studies included map analysis, field studies, and review of historical data. Map analyses were completed prior to field surveys, which were completed from June to August, in 2008 and 2009. Field data were collected on terrain, soil types, plant species presence, and vegetative cover. Soil and plant tissues were also collected for metal and radionuclide analyses in 2007, 2008 and 2009.

Historical data were reviewed and included in the VSBR wherever they provided an additional level of detail to baseline survey data. Historical data were largely from previous feasibility and environmental assessment studies in support of a mine development project proposed by Urangesellschaft Canada Ltd. (from the 1970s through to the 1990s). All references are referred to in relevant sections of this report and are listed in Section 8.

Analysis of vegetation and soil baseline conditions focused on the identification and description of Ecological Land Classification (ELC) units to quantify the habitat types that occur within the study areas. The ELC units are the basis for the description of vegetation and soil characteristics, and habitat suitability for key wildlife resources (see Technical Appendix 6C)).

Projection: NAD 1983 UTM Zone 14N
Creator: Caslys Consulting Ltd.
Date: 1/13/2011 Scale: 1:16,000,000
File: 1.1-1_Project_Location_Figure
Data Sources: Natural Resources Canada, GeoBase®, National Topographic Database, Geological Survey of Canada, and Caslys Consulting Ltd.

FIGURE 1.1-1
PROJECT LOCATION MAP

KIGGAVIK PROJECT - EIS

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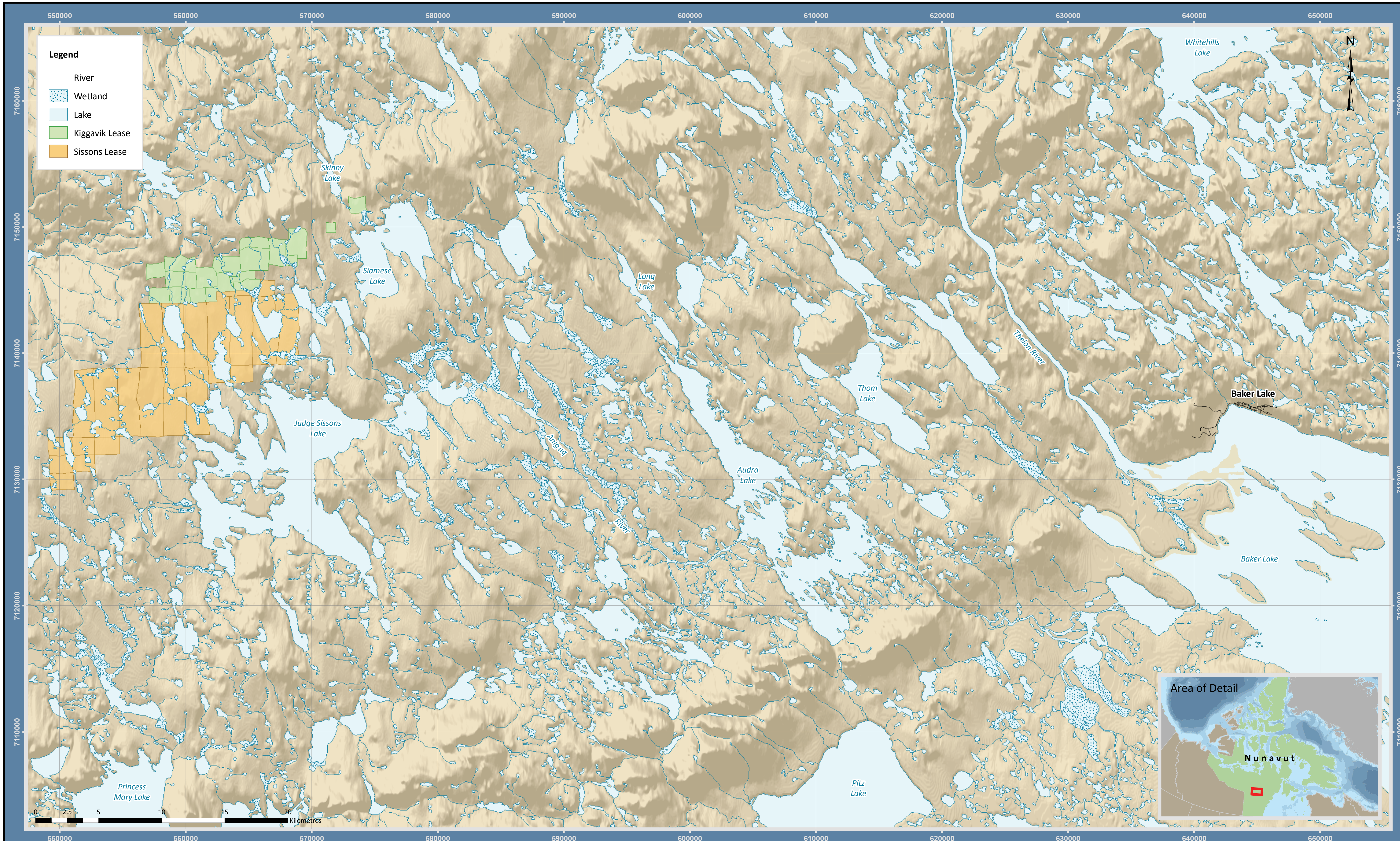

Projection: NAD 1983 UTM Zone 14N
Creator: CASLYS CONSULTING LTD.
Date: 1/13/2011 Scale: 1:275,000
File: 1.1-2_Location_Kiggavik_Sissons_Lease_Areas.mxd
Data Sources: Natural Resources Canada, GeoBase®, National Topographic Database, AREVA Resources Canada Inc., and Gebauer & Associates.

FIGURE 1.1-2
LOCATION OF KIGGAVIK AND SISSONS LEASE AREAS

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2 SETTING

2.1 TERRESTRIAL BIOPHYSICAL SETTING

The Kiggavik Project is situated in an area characterized by low, rolling hills with minimal topographic relief. Elevation ranges from approximately 130 to 170 m above sea level at lakeshores to 250 m on ridge crests north of Pointer Lake. The general topography of the project area is southern aspect sloping downwards towards Judge Sissons Lake.

Regional surficial geology is characterized by ground moraine and glaciofluvial deposits, and minimal organic/peat deposits, as well as exposed bedrock and water (Wickware 1990). In general, the area around the Kiggavik Project is characterized by a one to four metre thick layer of granular glacial till overlying bedrock, except in areas where till has eroded and bedrock is exposed. Near surface bedrock is observed to be shattered in some areas as a result of frost action and fractures are ice-filled (AREVA 2008). Most areas are covered predominantly in heath tundra vegetation interspersed with lichen-dominated bedrock outcroppings and boulder fields.

The regional biophysical setting can be further characterized according to the characteristics of the represented terrestrial ecoregions. The main ecoregions around the Kiggavik Project include (see Figure 2.1-1):

- Dubawnt Lake Plain/Upland Ecoregion;
- Back River Plain Ecoregion; and
- Maguse River Upland Ecoregion.

Typical characteristics of ecoregions are provided below for context, but details can be found in other documents (e.g., Wiken et al. 1987). A summary of existing biophysical conditions is also provided in the Kiggavik Project Proposal (AREVA 2008).

The Dubawnt Lake Plain/Upland Ecoregion, in which the Kiggavik Project is centred, is dominated by a low-lying, rolling plain comprised primarily of deep to shallow morainal deposits in elongated to fluted northwesterly trending ridges. Soils are young and slightly weathered, typically frost churned. Permafrost is continuous with a shallow depth of thaw (less than 100 cm). Rocky outcrops, wetlands and eskers are found infrequently. Dominant soils are Turbic and Static Cryosols developed on level to undulating, discontinuous veneers of sandy morainal and fluvioglacial deposits. The ecoregion has a nearly continuous cover of shrub tundra vegetation, consisting of dwarf birch (*Betula nana*), willow (*Salix* sp.), northern Labrador tea (*Rhododendron tomentosum*), avens (*Dryas* sp.), blueberry (*Vaccinium* sp.) and heath species.

Tall dwarf birch, willow, and alder (*Alnus* sp.) occur on warm sites while willows, sedges, and moss dominate wet sites.

The Back River Plain Ecoregion, to the north of the Kiggavik Project, is dominated by level-to-hilly plains consisting primarily of deep to shallow morainal deposits. Many areas within the ecoregion are mantled by fine deposits of glaciomarine or glaciolacustrine origin. Soils are young and slightly weathered, typically frost churned. Permafrost is continuous with a shallow depth of thaw (less than 100 cm). Dominant soils are Turbic Cryosols developed on level to undulating, discontinuous veneers of sandy morainal and fluvioglacial material. Wetlands have Organic Cryosols. Back River Plain Ecoregion vegetation is generally characterized as a shrub tundra community, consisting of dwarf birch, willows, northern Labrador tea, avens, and blueberry. Well-drained upper slopes tend to have a discontinuous vegetative cover. Tall dwarf birch, willow, and alder occur on warm sites while wet sites are dominated by willow, moss, and sedge tussocks. Clumps of dwarf black (*Picea mariana*) and white spruce (*Picea glauca*) and tamarack (*Larix laricina*) occur at lower elevations along the Thelon River in the southwest portion.

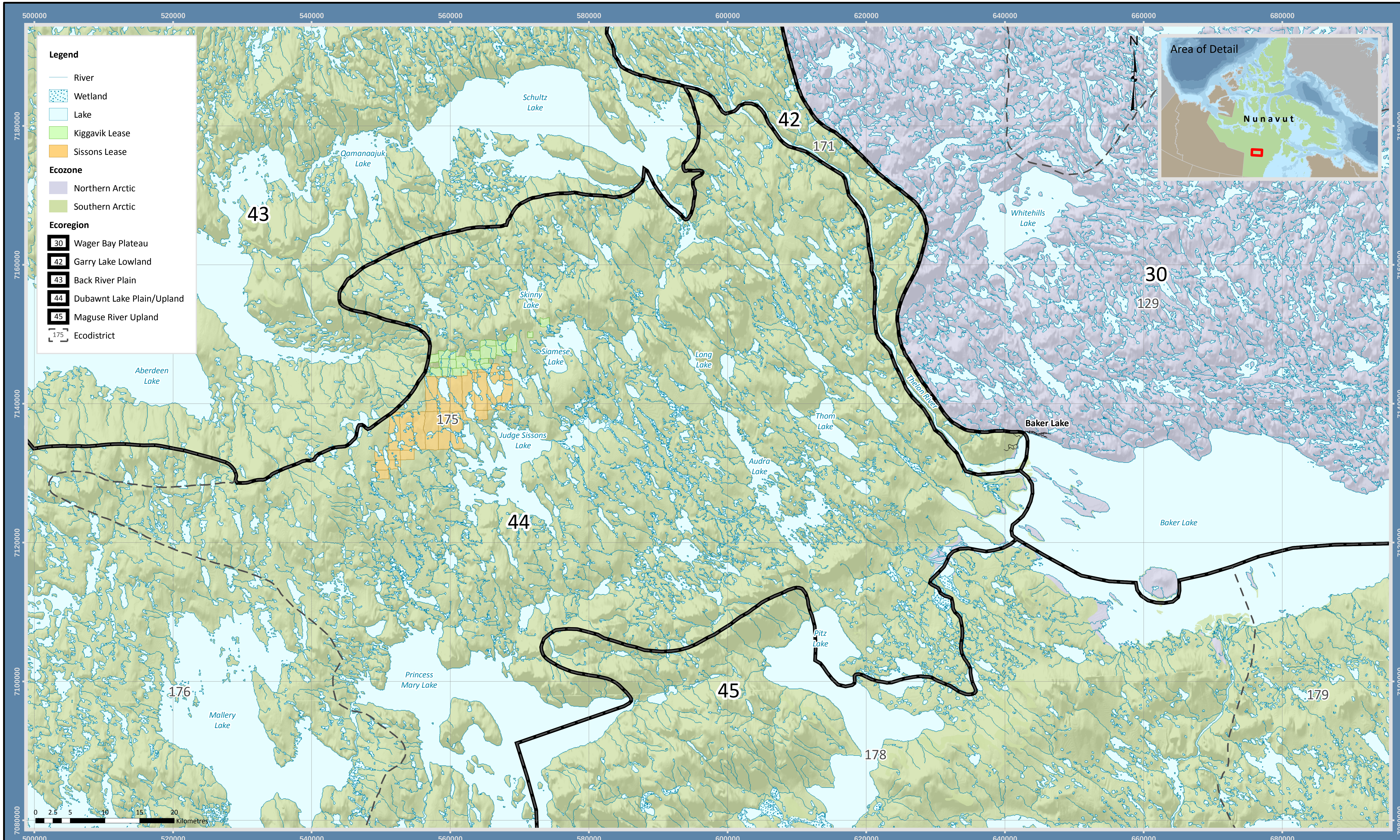
The Maguse River Upland Ecoregion to the south is dominated by a gently rolling morainal plain, partly modified by marine submergence. The coastal portion consists of deep silt and sand deposits, whereas the inland portion is characterized by extensive areas of marine and alluvial deposits, which have been reworked by marine action. The ecoregion is characterized by broadly sloping lowlands and plateaus consisting of massive rock, glacial moraine and marine sediments. Soils are young, slightly weathered and frost-churned, and permafrost is continuous. Hummocky bedrock outcrops covered with discontinuous acidic, sandy, granitic tills are dominant. Prominent fluvioglacial ridges (eskers) also occur. Shrub tundra vegetation also characterizes this ecoregion with dwarf birch, willow, and alder occurring on warm, dry sites and willow, sphagnum moss (*Sphagnum* spp.), and sedge dominating poorly drained sites.

2.2 HUMAN SETTING

The Hamlet of Baker Lake, with a population of approximately 1,728 (Statistics Canada 2006, internet site), is the nearest community to the proposed Kiggavik Project (Figure 1.1-1). The community is situated on the northwest shore of Baker Lake near the mouth of the Thelon River. Baker Lake is Nunavut's only inland, non-marine Inuit community. Traditionally, the Inuit of this area were almost entirely dependent on caribou for subsistence, and moved seasonally with migrating caribou. It was not until the 1950s that the community along the shores of Baker Lake was permanently established.

Historically, the predominant human activity on the land around the Kiggavik Project was subsistence hunting and gathering. Hunting and trapping activity in this area has been described as relatively limited in the past (i.e., 1960s and 1970s), for reasons including distance from Baker Lake, absence of road access, and the relatively low abundance of target species (IDS 1978). Many Inuit in Baker Lake depend heavily on caribou for food, particularly since interest in 'southern foods' is still low and income levels limit food purchases from grocery stores (see Technical Appendix 9A of the EIS). Inuit Quajimajatuqangit (IQ) studies completed as part of the AREVA baseline program provide evidence of historical and present day hunting, trapping, and gathering activities around the Kiggavik Project and in the area between the Project and Baker Lake. Residents of coastal communities such as Chesterfield Inlet are also known to travel to the Baker Lake area for hunting opportunities (see Appendix x of this DEIS). Caribou is the most important wildlife species for local communities, both traditionally and presently. Important caribou hunting areas occur throughout the region. Other species harvested and used include fox, wolf, muskox, and various waterfowl, birds and eggs. All of these species depend directly on the terrestrial habitat, namely the vegetation and soil resources. Various plant species have also been identified as having historical and present day human uses, including plants used for medicine, bedding, fire starting, and as food sources, particularly edible berries.

Industrial land use in the region has focused on mining and exploration activities. The first mine in Kivalliq, the North Rankin Nickel Mine, operated from the 1950s until its closure in 1962. Uranium exploration in the area around the Kiggavik Project began in the 1970s. Currently, only one active mine is operating in the Kivalliq region, the Agnico-Eagle Mines Ltd. (AEM) Meadowbank Project located 75 km north of Baker Lake, which began operations in early 2010. The only other mines nearby are not currently active; the Doris North Gold Project located approximately 580 km northwest of the Kiggavik Project, the Tahera Jericho mine located approximately 670 km away, and the Cullaton Lake/Shear Lake Gold Mine located approximately 360 km southwest of Baker Lake. However, in 2008, 45 active exploration projects, which were focused on uranium, gold, nickel and diamonds, were recorded in the Kivalliq region (Nunavut Geoscience 2010, internet site).



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Data Sources: Natural Resources Canada, GeoBase®, National Topographic Database, AREVA Resources Canada Inc., and Gebauer & Associates.

FIGURE 2.1-1
LOCATION OF KIGGAVIK PROJECT AND NEARBY TERRESTRIAL ECOREGIONS

KIGGAVIK PROJECT - EIS

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3 STUDY AREAS

3.1 REGIONAL STUDY AREA

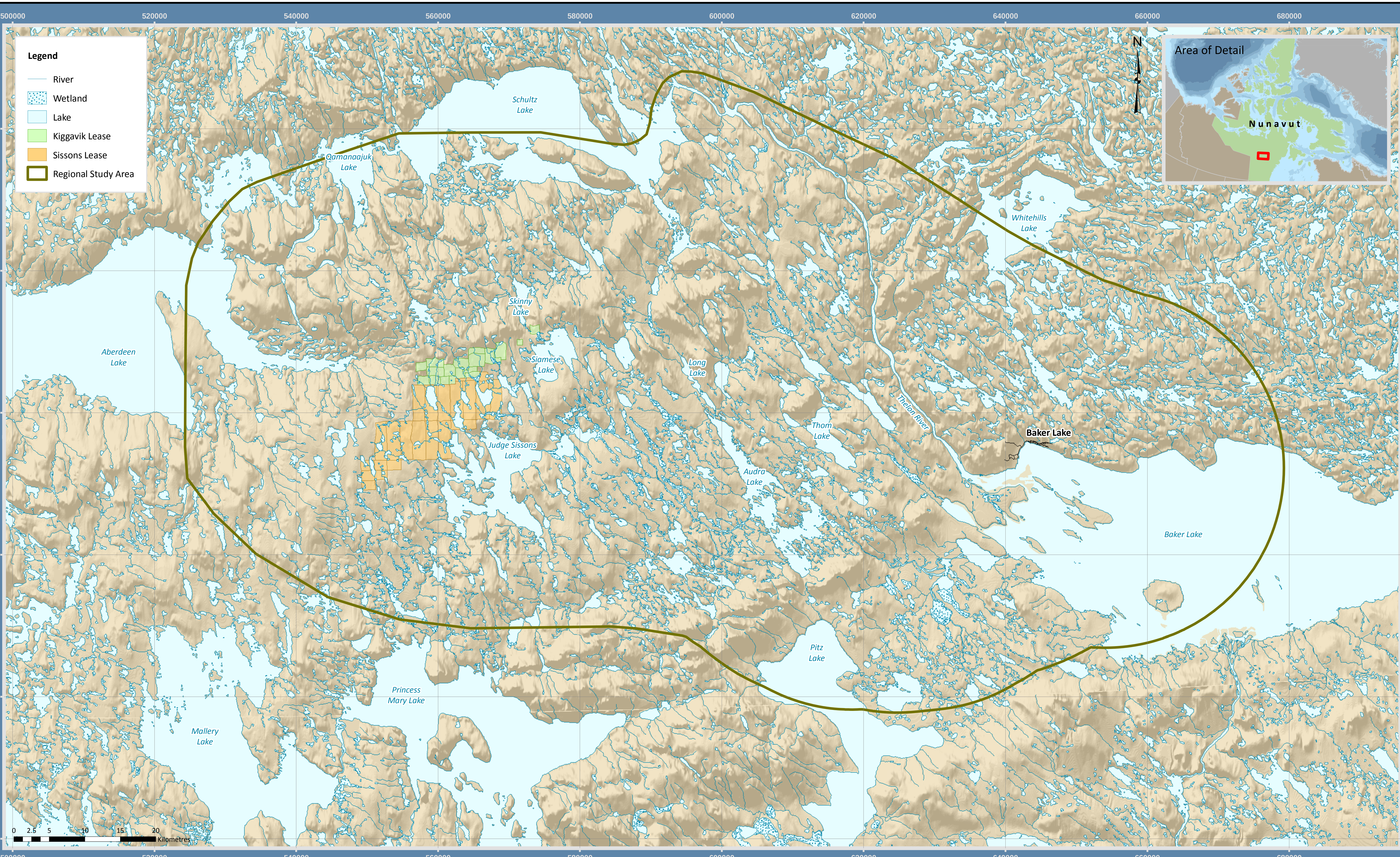
For the purposes of the Terrestrial Wildlife Baseline Report (TWBR), the boundaries established for the Regional Study Area (RSA) in 2010 will be used. The boundaries incorporate all of the proposed Project facilities at and west of Baker Lake including three proposed access road options (i.e., all local study areas [LSAs] described in the following sections), surrounded by a minimum 25 km wide buffer. The resulting RSA is 150 km long and 70 km wide, constituting a total area of 9,828 km^2 (see Figure 3.1-1). The RSA includes all of Judge Sissons Lake, the southern portions of Aberdeen and Schultz lakes, while Princess Mary Lake is located just to the south.

The spatial extent of the RSA was selected based on the anticipated mine plan for the Project, known caribou water crossing locations along the Thelon River basin (DIAND 1992), and critical areas identified by IQ studies (see Volume 3 of the EIS). The Kiggavik RSA is also comparable to study area sizes for caribou and other large mammals (i.e., muskox, grizzly bears, and wolves) for other mining projects in Nunavut and Northwest Territories (NWT) (i.e., projects such as AEM Meadowbank, Jericho, Doris North, Diavik and Gahcho Kué). The RSA also includes areas with similar conditions to those found in the Mine LSA and access road LSAs, which will allow the RSA to be used as a comparable reference area for monitoring potential changes as the Project moves forward.

3.2 LOCAL STUDY AREAS

The Local Study Area (LSA) at the mine site is centered on the Kiggavik and Sissons deposits with an approximate five kilometer buffer around all proposed Project facilities, including a proposed airstrip and site haul roads. Dimensions of the Mine LSA are approximately 29 km wide by 20 km wide, constituting a total area of 450 km^2 (Figure 3.2-1).

The access road LSAs include a five kilometer-wide LSA centered on all four of the proposed road alignments currently under consideration (see Figure 3.2-2), including two All-Weather Access Road (AWAR) alignments and two Winter Access Road alignments. The South AWAR has a total LSA of 535 km^2 and the North AWAR has a total LSA of 520 km^2. The Winter Access Road (South) has a total LSA of 561 km^2. The Winter Access Road (North), which is currently only considered as a partial segment connecting to other alignments, has a total LSA of 297 km^2. The South AWAR has recently been removed for further consideration as a possible access route to the mine. Other potential facilities within some of the road alignments include a dock facility at Baker Lake, a bridge/cable ferry crossing at the Thelon River, and potential quarry sites.



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File: 3.1-1_Boundary_of_Kiggavik_RSA.mxd
Data Sources: Natural Resources Canada, GeoBase®, National Topographic Database, AREVA Resources Canada Inc., and Gebauer & Associates.

FIGURE 3.1-1
BOUNDARY OF THE REGIONAL STUDY AREA (RSA)

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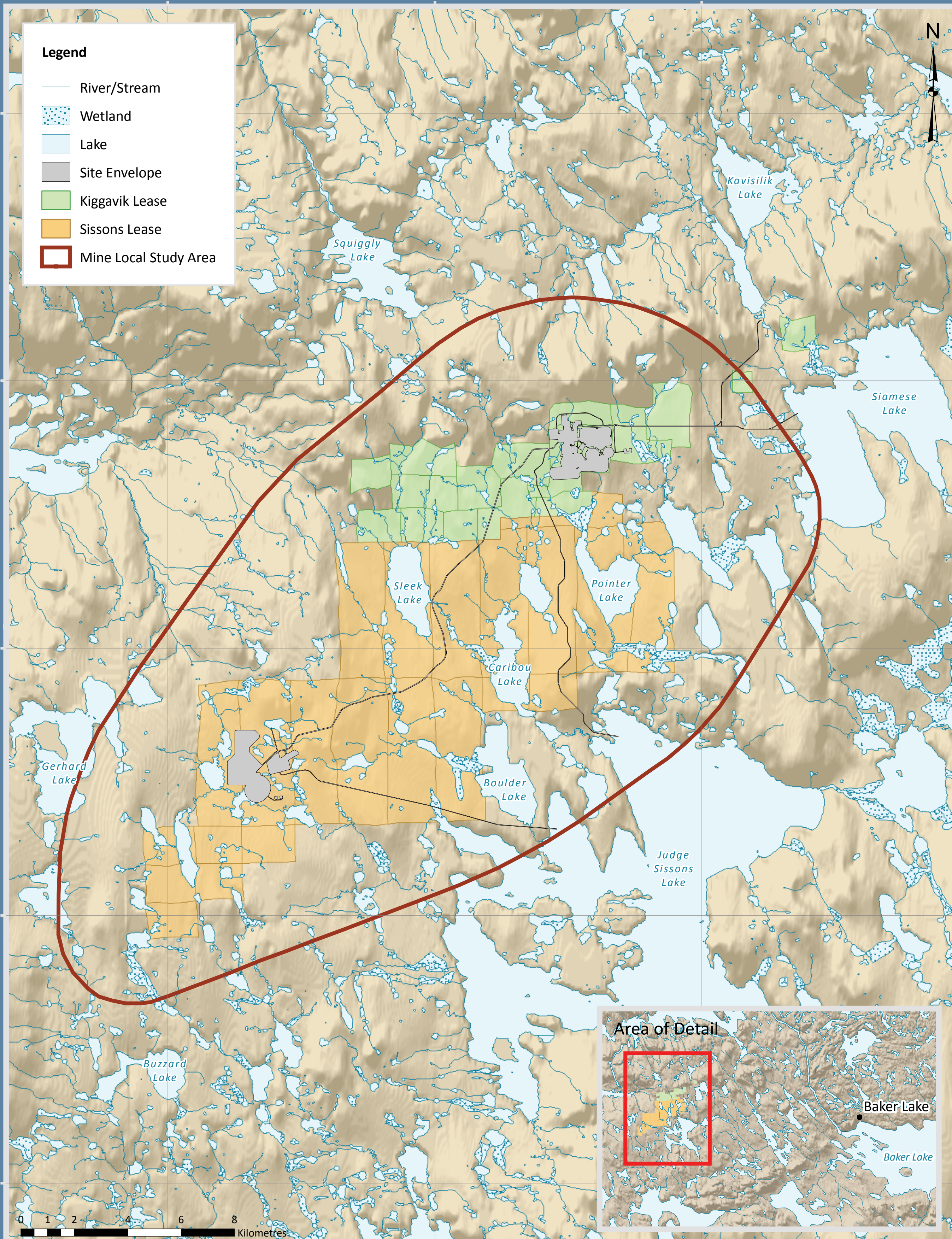

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Data Sources: Natural Resources Canada, GeoBase®, National Topographic Database, AREVA Resources Canada Inc., and Gebauer & Associates.

FIGURE 3.2-1
BOUNDARY OF THE MINE LOCAL STUDY AREA (LSA)

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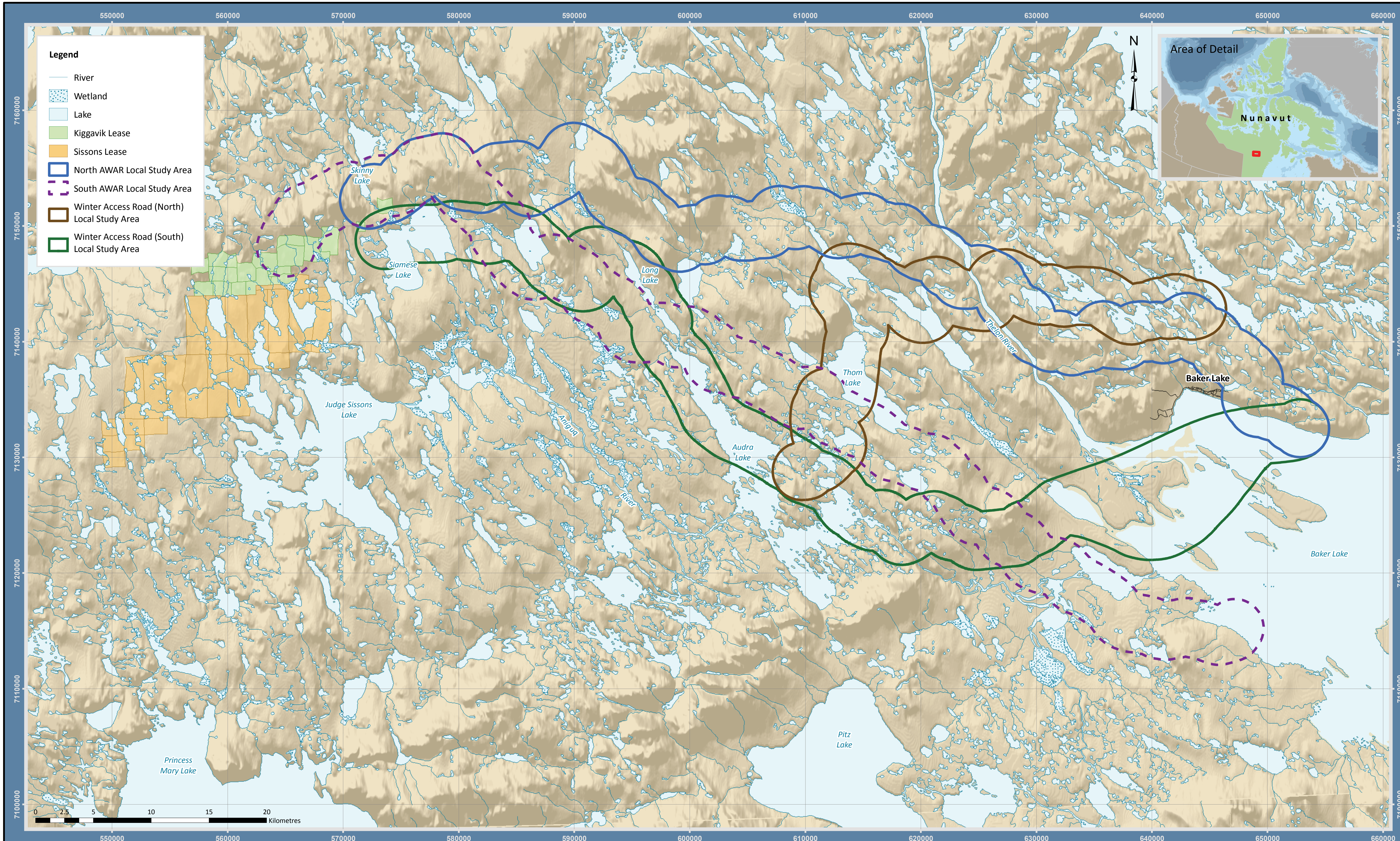

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File: 3.2-2_Access_Road_and_Facility_LSAs.mxd
Data Sources: Natural Resources Canada, GeoBase®, National Topographic Database, AREVA Resources Canada Inc., and Gebauer & Associates.

FIGURE 3.2-2
BOUNDARIES OF LOCAL STUDY AREAS FOR ACCESS ROADS AND ASSOCIATED FACILITIES

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4 VEGETATION

4.1 METHODS

4.1.1 Literature Review

Historical studies in the area around the Kiggavik Project, largely investigations initiated by Urangesellschaft, were integrated as much as possible in the characterization of baseline vegetation conditions for the Mine Local Study Area (LSA), road LSAs and Regional Study Area (RSA). Wherever possible, comparable historical data were used to describe baseline conditions. Differences in study area, design and methodologies, as well as incompleteness of some datasets, prevented direct comparisons with baseline data collected from 2007 to 2010. At a minimum, the availability of historical data is discussed prior to presentation of baseline data, to provide additional context. A summary table of historical studies related to vegetation resources is provided in Table 4.1-1 (including current baseline studies).

The recent development and proximity of the Agnico-Eagle Mine (AEM) Meadowbank Project located east of the Kiggavik Project and north of Baker Lake makes it a useful source of regional data. Terrestrial baseline studies were completed at Meadowbank from 1999 to 2005 and long-term monitoring studies have been completed from 2006 to 2010. Wherever possible this information was used to provide additional regional context (AEM 2009, 2010; Cumberland 2005). Other available information on vegetation resources included information on plant uses from Inuit Quajimajatuqangit (IQ) studies, as well as Ecological Land Classification (ELC) data collected in the RSA by the Government of Nunavut (GN), which was provided under a data-sharing agreement with AREVA.

Table 4.1-1 Summary List of Available Baseline and Historical Data on Vegetation Conditions

Year (reference)	Reconnaissance	Land Classification	Species Inventory	Vegetative Cover	Plant Tissue Chemistry
1979 (Speller et al. 1979)	-	-	LSA RSA	LSA RSA	LSA RSA
1980 (URG 1981)	-	-	LSA RSA	LSA RSA	-
1983 (Kershaw et al. 1983)	-	-	-	-	LSA
1985 (Svoboda et al. 1985)	-	-	-	-	LSA RSA
1986-1989 (Beak 1988; Wickware 1990)	Mine LSA LSAs (BL) RSA	Mine LSA RSA	Mine LSA	Mine LSA	LSA RSA
1990 (Geomatics 1990)	-	Sissons LSA	Sissons LSA	Sissons LSA	-
1991 (Geomatics 1991)	-	-	LSA LSAs (BL)	LSA LSAs (BL)	LSA
2007	-	Mine LSA RSA	-	-	LSA
2008	LSAs RSA	LSAs RSA	LSAs RSA	LSAs RSA	LSA
2009	LSAs RSA	LSAs RSA	LSAs RSA	LSAs RSA	RSA

'-' = type of survey was not included
BL = Baker Lake dock facility; LSAs = refers to North and South AWAR, and/or Winter Access Road (North or South) LSAs (note that RSA/LSA pre-2007 boundaries are different than presented herein)

4.1.2 Field Surveys

4.1.2.1 Ecological Land Classification

The ELC process delineates unique and distinguishable habitat types on the landscape using a combination of satellite imagery, map analysis and field surveys. Initial ELC was completed in 2007 using satellite images to identify vegetation communities. A more rigorous ELC was completed beginning in 2008. Important collaboration and data sharing with the Nunavut Department of Environment (DoE; Mitch Campbell) also contributed to the ELC, as did additional ground data and mapping methodologies developed by the Nunavut Department of Sustainable Development.

Prior to field surveys, a preliminary (or unsupervised) classification was completed using Landsat 7 satellite image data and PCI Geomatica 10.0.3 imaging software to detect and extract unique land cover features and to identify areas for site visits during field surveys. Algorithms compared the spectral signatures of individual pixels on satellite images to the signatures of computer-determined classes and assigned each pixel to one of these classes. The preliminary classification yielded 67 unique classes, which were then examined against the imagery and grouped into similar ELC types. The resulting 16 potential ELC units were subsequently used as the basis for the delineation of the field survey plots used to ground truth the information.

Field surveys are critical for refining the ELC units and their boundaries. Survey plots were selected using the preliminary ELC classification to ensure that all potential ELC units would be adequately surveyed. Features easily identifiable at a scale of 1:50,000 were preferred. Field logistics, including access, timing and terrain, were also taken into consideration. Because DoE field survey data covering the full extent of the RSA and beyond were available, 2008 field surveys were concentrated along the North All-Weather Access Road (AWAR), while 2009 field surveys were concentrated in the Mine LSA and the potential quarry sites. These particular study areas were chosen for ELC field surveys because of preferred design alternatives identified by AREVA. The refinement of the classification used DoE field survey data for the RSA and 2008/09 field survey data from LSAs to assess the accuracy of the classification. Although the field surveys focused on the Mine LSA and North AWAR, these field data were used to refine the ELC for the larger area.

A total of 374 plots was surveyed (Figure 4.1-1). Of the 374 plots, 183 were from the DoE ELC program, 107 were from the 2008 field program and 84 were from the 2009 program. For each 20 by 20 m plot, detailed information relating to landform characteristics (e.g., slope, hummocks, tussocks, etc.), moisture regime, substrate (e.g., peat, moss, boulder, bedrock, etc.) and vegetation composition were collected. Photographs were also taken at each plot.

4.1.2.2 Vegetation Survey

As noted, vegetation species were recorded at each of the above ELC field survey plots (Figure 4.1-1), using 20 by 20 m plots for sampling. Data forms created by the DoE were used to ensure compatibility between AREVA and GN field programs. An effort was made to survey all plant associations.

Habitats that could potentially harbour rare plant species (e.g., rock faces, seep sites, etc.) were investigated opportunistically during the ELC plot sampling surveys. Vegetation survey plots would have been completed around any rare plants observed; however, no rare plants were encountered during the field surveys (see Section 4.2.4 for discussion on rare plant presence).

Biologists were constantly on the lookout for rare plants and rare plant associations during any vegetation and wildlife survey work. Three major publications on rare plants in the North were referred to (Cody 1979; McJannet et al. 1993, 1995). Information on rare plant species posted by the federal Species at Risk Act (SARA) and Committee on the Status of Endangered Wildlife in Canada (COSEWIC) was also accessed (COSEWIC 2009, internet site; SARA 2009, internet site).

4.1.2.3 Plant Tissue Chemistry Sampling

The sampling strategy called for the collection of plant tissue from 12 sampling locations around the RSA and Mine LSA for chemical analysis of specimen tissue (Figure 4.1-2). Different plant tissues were collected including berries (mostly crowberry [*Empetrum nigrum*]), sedges (*Carex* sp.) and lichen (*Cetraria* sp. and *Cladina* sp.).

In 2007, six ‘near-field’ locations were identified as permanent sample plots in the Mine LSA and tissue samples were collected from each location (KIG1, KIG2 and KIG3, and SIS1, SIS2 and SIS3; see Figure 4.1-2). Based on analysis of preliminary data, recommendations were made to increase the number of sampling locations both inside and outside the Mine LSA to obtain better representation of pre-Project conditions. Consequently, four additional near-field locations were identified in the Mine LSA (KIG4 and KIG5, and SIS4 and SIS5; see Figure 4.1-2). Tissue samples were collected at all 10 of the sampling locations in 2008. In 2009, two ‘far-field’ locations were identified in the RSA in areas outside of the potential influence of mine facilities, as indicated by air dispersion models. In addition to documenting baseline conditions on terrestrial food sources within both the Mine LSA and the RSA, ongoing monitoring of plant tissue chemistry from near-field and far-field sampling locations will help evaluate any observed changes as Project activities proceed. Soil samples (see Section 5 below), and insect and small mammal/bird tissues were collected at the same locations.

At each of the 12 sampling locations, five sample sites were selected within a 200 to 300 m radius, with a minimum distance of 150 m between sample sites. Coordinates of sampling sites at each of the 12 sampling locations are provided in Attachment A. Within each sample site, five grab samples of plant tissue were collected within a five metre radius. Plant tissues were collected by randomly selecting and grabbing or pulling representative plants (i.e., sedges, lichens, and berries). For berries, approximately two cups were targeted for collection at each site.

Standard sampling procedures were followed for quality assurance/quality control (QA/QC) including: delineating the sampling area prior to collection (i.e., to avoid trampling material), collecting only aboveground material, and cleaning samples to remove all non-target species and debris. Field staff wore latex gloves. Samples were placed in Zip-Loc bags, stored in a cooler, and shipped on ice directly to the laboratory.

In 2007 and 2008, 180 samples were collected in the Mine LSA, including 50 berry samples, 56 sedge samples and 56 lichen samples. In addition to these samples, 18 samples of foliage from birch, willow and blueberry bush were also collected in 2007. The total number of samples collected in the RSA in 2009 (i.e., future reference sites) was 22, consisting of two berry samples, 10 sedge samples, and 10 lichen samples.

4.1.3 Laboratory Analysis

Plant tissue samples were sent to Saskatchewan Research Council (SRC) Analytical Laboratories (Saskatoon, SK) and analyzed for moisture content, total metals on a wet weight basis, and radionuclides. In 2007, all samples were analyzed individually for metals and radionuclides (except Thorium-232). In 2008, all samples were analyzed individually for metals. However, due to minimum weight requirements for radionuclide analysis, berry samples were composited into 10 samples, and sedge/lichen samples were combined into 35 composite and 20 individual samples for radionuclide analysis. In 2009, all samples from the RSA were analyzed individually for metals and radionuclides. Details on analytical methods are provided in Attachment B. Particular parameters were analyzed as follows:

- Elemental analysis by ICP Atomic Emission Spectroscopy (ICP-AES) and Inductively Coupled Plasma Mass Spectrometry (ICP-MS);
- Radium-226, Thorium isotopes and Polonium-210 by Alpha Spectroscopy; and
- Lead-210 by Beta Counting of the Bismuth-210 Successor Product

4.1.4 Data Analysis

4.1.4.1 Ecological Land Classification

A final, or supervised, ELC classification was completed to refine the results of the preliminary classification using field survey data collected from the DoE field program. Field information from each plot (e.g., substrate, vegetation, etc.) was examined and assigned an ELC unit based on the dominant biotic and abiotic features. These representative plots were then overlaid on the preliminary ELC classification to compare attribute assignments. Any preliminary unit that contained multiple ELC units (i.e., based on the survey plots) was then extracted and a final supervised classification was performed on this subset. During the final classification, clustering algorithms were used to assign each subset pixel to pre-defined ELC units, as defined by the representative plots surveyed in the field program. This method facilitates the separation of similar types of units. The ELC units identified in the final classification and the details concerning the survey plots for each of these units are provided in Table 4.1-2.

The accuracy of the final classification was assessed by comparing the ELC mapping to the 191 plots from the Kiggavik field survey program completed in 2008 and 2009. The assessment extracts all the values within 50 m of the survey plot and then compares them with the unit of the plot. This approach overcomes the spatial inaccuracies of the GPS-derived locations for the survey plots and the spatial resolution of the Landsat imagery, and accounts for the scale differences. The overall accuracy of the classification was 82%. Typically, the accuracy threshold for a satellite classification is 80%; therefore, the accuracy of this classification exceeds this threshold by 2%. The units that have lower accuracies (<75%) are typically the transitional units. For example, the accuracy of the Shrub/Heath Tundra unit is relatively low (73%) because it is the transition between Shrub Tundra and Heath Tundra units.

Table 4.1-2 Frequency of Field Survey Plots by Ecological Land Classification Unit

ELC Units	No. of Survey Plots in ELC Unit	% of Survey Plots by ELC Unit
Water[(a)]	0	0.0
Disturbance[(a)]	0	0.0
Cloud/Shadow[(a)]	0	0.0
Sand	0	0.0
Gravel	5	1.3
Rock Association	19	5.1
Wet Graminoid	42	11.2
Graminoid Tundra	46	12.3
Graminoid/Shrub Tundra	21	5.6
Shrub Tundra	42	11.2
Shrub/Heath Tundra	19	5.1
Heath Tundra	66	17.6
Heath Upland	47	12.6
Heath Upland/Rock Complex	55	14.7
Lichen Tundra	12	3.2
Total	374	100%

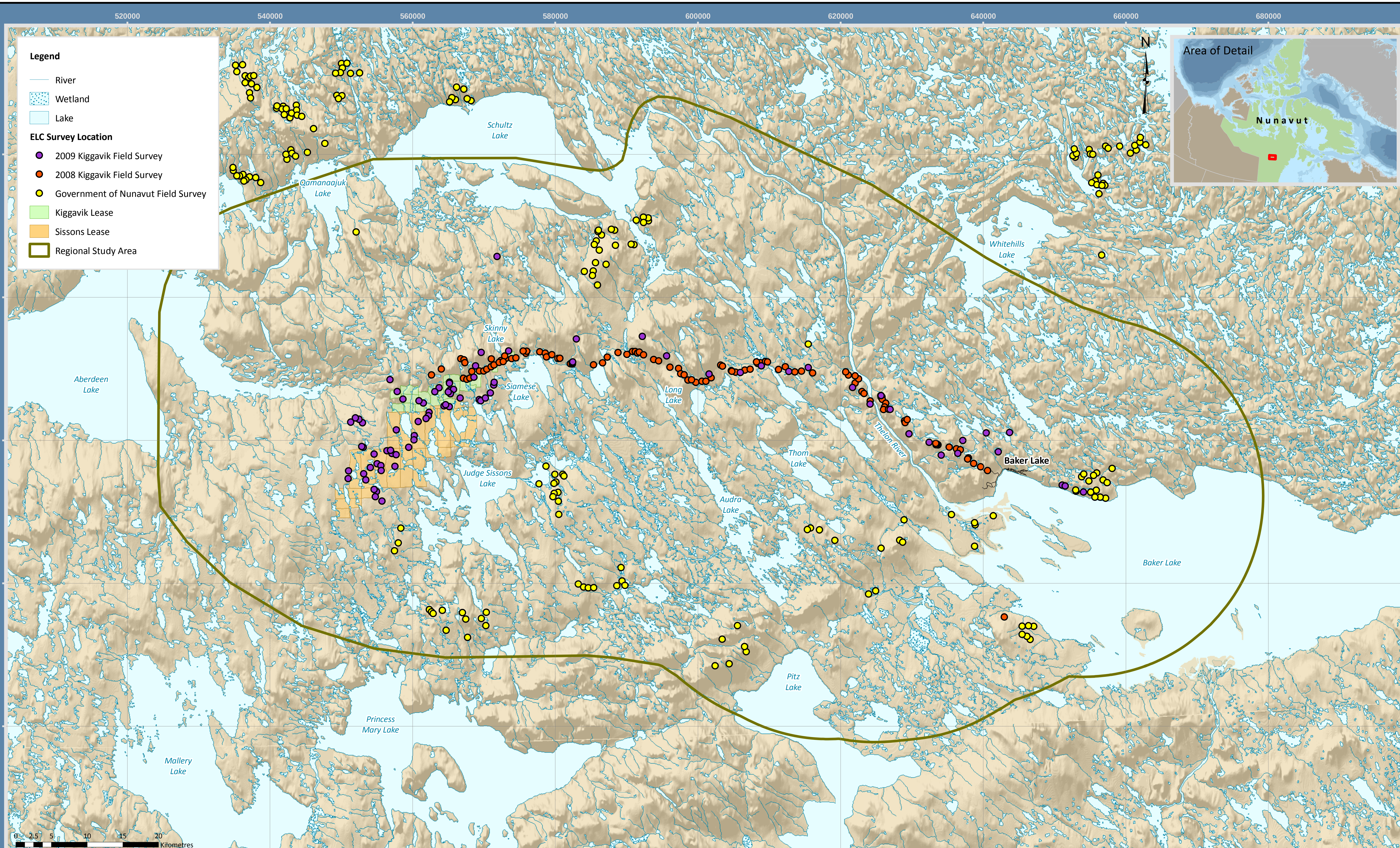
[(a)] These classes are easily extractable with high confidence from the imagery and therefore were not field surveyed

4.1.4.2 Vegetation Survey Data

Basic statistics were used to analyze vegetation survey data from the available baseline database. Calculated measures included total number of species and average number of species per plot for each ELC unit.

4.1.4.3 Chemistry Data

Basic statistics (i.e., mean, standard deviation, minimum and maximum) were used to analyze chemistry data from the available baseline database. Data were summarized separately for each plant type, and for the Mine LSA and RSA. Statistical calculations used a value equivalent to half of the detection limit value for results below detection limit, considered to be a conservative estimate. Using these summary statistics, comparisons could be made between different areas, such as stations within the Mine LSA and RSA, and different years (i.e., more recent data from 2007 to 2009 compared to historical data, where available).



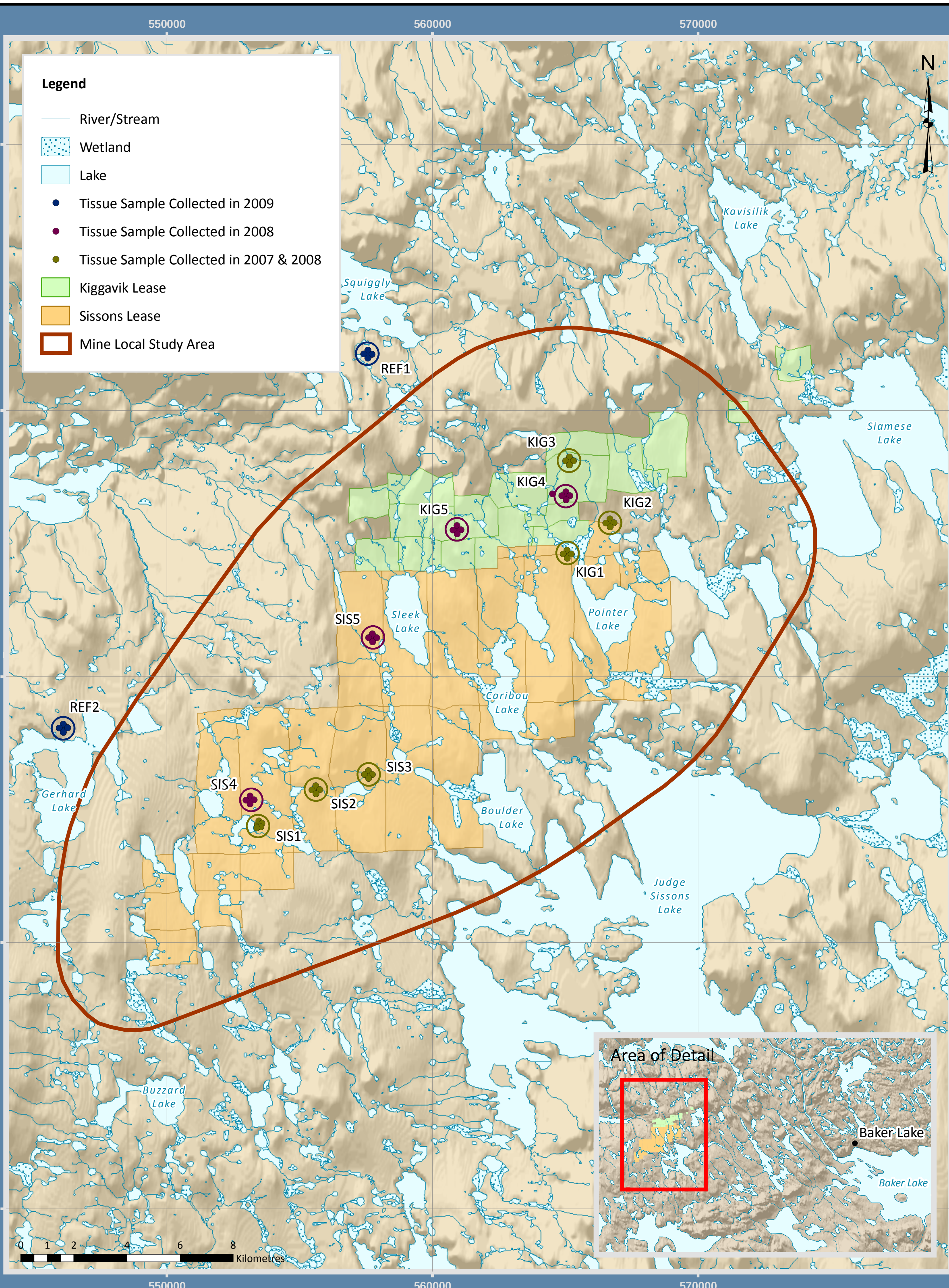
Projection: NAD 1983 UTM Zone 14N
Creator: CASLYS CONSULTING LTD.
Date: 01/11/2011 Scale: 1:500,000
File: 4.1-1_ELC_Field_Survey_Plots.mxd
Data Sources: Natural Resources Canada, GeoBase®, National Topographic Database, AREVA Resources Canada Inc., and Gebauer & Associates.

FIGURE 4.1-1
ECOLOGICAL LAND CLASSIFICATION (ELC)
FIELD SURVEY PLOTS

KIGGAVIK PROJECT - EIS

Gebauer & Associates ENVIRONMENTAL CONSULTANTS
CASLYS CONSULTING
AREVA

AREVA Resources Canada Inc - P.O. Box 9204 - 817 - 45th Street West - Saskatoon, SK - S7K 3X5



Projection: NAD 1983 UTM Zone 14N
Creator: CASLYS CONSULTING LTD.
Date: 01/26/2011 Scale: 1:200,000
File: 4.1-2_Plant_Tissue_Samples.mxd
Data Sources: Natural Resources Canada, GeoBase®, National Topographic Database, AREVA Resources Canada Inc., and Gebauer & Associates.

FIGURE 4.1-2
PLANT TISSUE SAMPLING LOCATIONS

KIGGAVIK PROJECT - EIS

Gebauer & Associates
ENVIRONMENTAL CONSULTANTS

CASLYS CONSULTING

AREVA

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4.2 RESULTS

4.2.1 Description of Ecological Land Classification Units

Earlier efforts followed similar concepts of classifying vegetation types in the area surrounding the Kiggavik Project, although using different approaches (Table 4.2-1). Historical studies qualitatively grouped vegetation associations based on physiognomy (general appearance) of the vegetation and not species groupings (Beak 1987b). Initial baseline work completed in 2007 identified updated vegetation communities based only on satellite images.

Table 4.2-1 Comparison of Land Classification Systems Used in Current and Historical Studies

1980s Ecological Land Survey (Major Vegetation Associations)[(a)]	2007 Ecological Landscape Classification	Current Ecological Land Classification Units
Rock Barrens Lichen Steppe Lichen-Heath Moss-Heath Dwarf Shrub Sedge Meadow Tussock Meadow	Water Bare Ground Bedrock Lichen Heath Boulder Heath Tundra Riparian Low Shrub Sedge Wetland Tussock-Hummock Willow-Boulder	Water Disturbance Cloud/Shadow Sand Gravel Rock Association Wet Graminoid Graminoid Tundra Graminoid/Shrub Tundra Shrub Tundra Shrub/Heath Tundra Heath Tundra Heath Upland Heath Upland/Rock Complex Lichen Tundra

(a) Beak 1987b

For this Vegetation and Soils Baseline Report (VSBR), the classification scheme was designed to identify ecologically relevant ELC units that will help facilitate discussion of wildlife habitat utilization, development of wildlife habitat suitability ratings, and future discussion of potential Project-related impacts. The ELC units identified for the Kiggavik Project also correspond to the GN classification scheme, allowing comparison to other regional data.

Descriptions of ELC units are based on observable features, species composition (in conjunction with terrain features), and/or ecological conditions in the immediate vicinity. Terrain and soil features (discussed in Section 5.2.3) are the basis for, and control the development of, plant communities. At the same time, since plant communities overlay terrain features, several community types may occur in the same geographic area. For example, boulders bear a complex lichen flora, yet the boulders themselves may be completely surrounded by Heath Tundra. Alternatively, Heath Tundra mats may be perched on boulders and surrounded by a boulder field. Each defined unit is simply a human effort to label, categorize, and define situations that occur as a continuum in the natural world.

A description of the vegetative communities in each of the ELC units of the Mine LSA, access road LSAs and RSA is provided below (more detailed lists of species present in each unit are provided in Section 4.2.3). Detailed data on the vegetation cover observed in each survey plot are provided in Attachment C. The percentages recorded for each category of vegetation and cover type are independent of one another and are not intended to add up to 100%. A complete list of plant species, including scientific and common names, is provided in Attachment D.

Water: Water features identified in the imagery. Typically, water bodies greater than 0.75 hectare (ha) in size and rivers greater than 75 m wide are distinguishable in Landsat imagery (Photo 4.1-1).

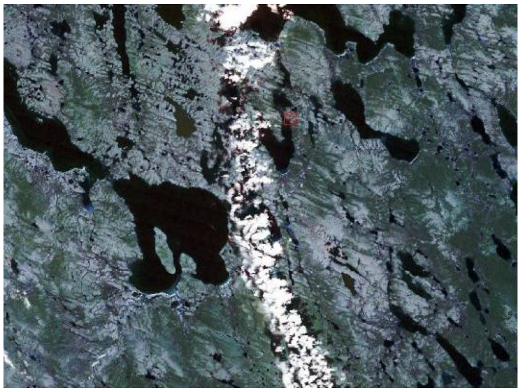
Photo 4.1-1 Ecological Land Classification Unit – Water

Disturbance: Anthropogenic disturbance on the landscape, located primarily near the community of Baker Lake (Photo 4.1-2).

Photo 4.1-2 Ecological Land Classification Unit – Disturbance

Cloud/Shadow: Areas of cloud and associated shadows present within the source Landsat image (Photo 4.1-3).

Photo 4.1-3 Ecological Land Classification Unit – Cloud/Shadow



Sand: Areas of exposed sand typically found in dry river or lake beds, or beach ridge uplands (Photo 4.1-4).

Photo 4.1-4 Ecological Land Classification Unit – Sand

Gravel: Areas of exposed gravel typically found in dry river or lake beds, eskers or beach ridge uplands (Photo 4.1-5).

Photo 4.1-5 Ecological Land Classification Unit – Gravel

Rock Association: Areas of bedrock outcrops and boulder fields (Photo 4.1-6).

Photo 4.1-6 Ecological Land Classification Unit – Rock Association

<u>Wet Graminoid</u>: Wet Graminoid (Sedge Wetland) communities occur in poorly drained areas (hygric moisture regime) and around water features. Water sedge (*Carex aquatilis)* and tall cottongrass (*Eriophorum angustifolium*) are dominant species. Moss is also present (Photo 4.1-7).

Photo 4.1-7 Ecological Land Classification Unit – Wet Graminoid

<u>Graminoid Tundra</u>: Graminoid Tundra consists of sedge communities that occur on more mesic areas. The unit includes tussock/hummock formations and is usually found on peat substrates. Dominant plant species include mesic *Carex* species, but also small amounts of water sedge, tall cottongrass, and shrub and forb species.

Photo 4.1-8 Ecological Land Classification Unit – Graminoid Tundra

<u>Graminoid/Shrub Tundra</u>: A transition between Graminoid Tundra areas and Shrub Tundra communities, the Graminoid/Shrub Tundra unit occurs in moist areas (mesic moisture regime) and consists of shrubs (25% or more) that are less than 40 cm in height. Graminoids, moss, and some lichen species are also present (Photo 4.1-9).

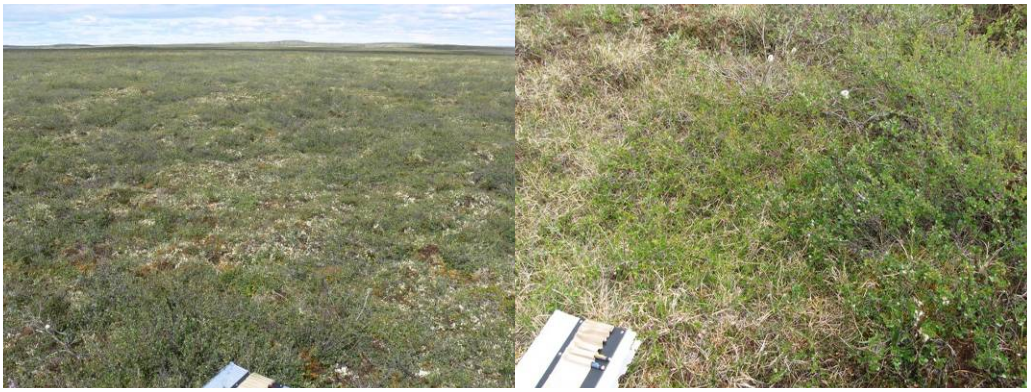
Photo 4.1-9 Ecological Land Classification Unit – Graminoid/Shrub Tundra

<u>Shrub Tundra</u>: Shrub Tundra has a mesic moisture regime and consists of communities that are composed of at least 50% shrub such as dwarf birch (*Betula glandulosa*) and diamond leaf willow (*Salix planifolia*). The understory can consist of some lichen and herb layers and moss may be present (Photo 4.1-10).

Photo 4.1-10 Ecological Land Classification Unit – Shrub Tundra

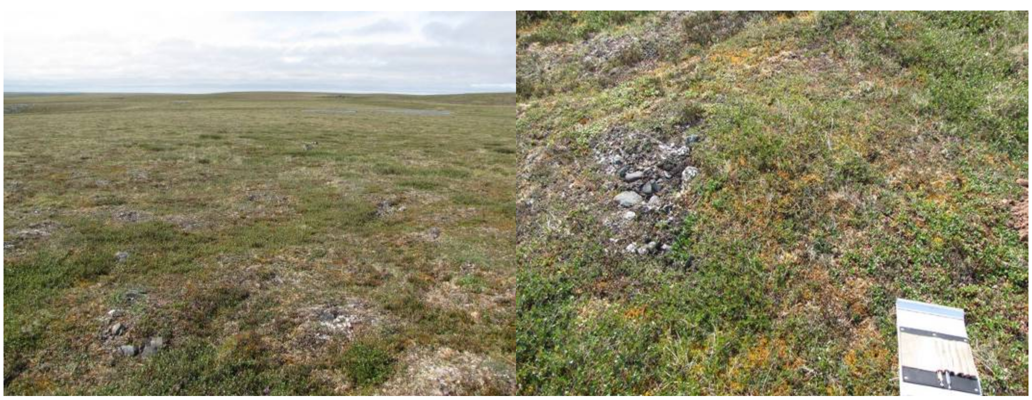
Shrub/Heath Tundra: A transitional unit between Shrub Tundra areas and Heath Tundra communities, it occurs on well to moderately drained soils (mesic-xeric moisture regime) and consists of between 30 to 50% shrubs that are less than 40 cm tall. Graminoids, moss, and some lichen species may be present (Photo 4.1-11).

Photo 4.1-11 Ecological Land Classification Unit – Shrub/Heath Tundra



Heath Tundra: Heath Tundra occurs on well to moderately drained soils (mesic-xeric moisture regime) and is dominated by ericaceous shrubs, lichens and some graminoids. Vegetative cover typically exceeds 70% with less than 30% rock. Erect shrubs are present but to a lesser degree than the Shrub/Heath Tundra unit (less than 30%) (Photo 4.1-12).

Photo 4.1-12 Ecological Land Classification Unit – Heath Tundra

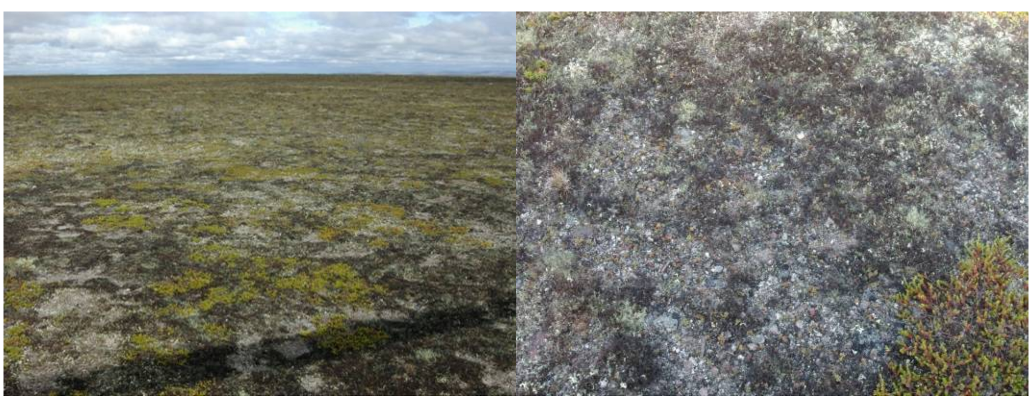


Heath Upland: Heath Upland occurs on well drained soils (xeric moisture regime) and is dominated by ericaceous shrubs, lichens and some graminoids. Typically, a rocky substrate is present (i.e., boulders, cobble, gravel, sand) but consists of over 70% vegetative cover. Bog blueberry (*Vaccinium uliginosum*), white arctic mountain heather (*Cassiope tetragona*), northern Labrador tea (*Ledum decumbens*), black crowberry (*Empetrum nigrum*) and ballroom dervish, a lichen (*Cetraria nivalis*) are the dominant species (Photo 4.1-13).

Photo 4.1-13 Ecological Land Classification Unit – Heath Upland

Lichen Tundra: Lichen Tundra communities develop on well drained and poorly developed soils (xeric moisture regime). The substrate is typically sand, gravel or cobble and most often associated with esker ridges and ridged moraine landforms. Green witch's hair lichen (*Alectoria ochroleuca*), *Bryoria nitidula*, crinkled snow lichen (*Cetraria cucullata*), Iceland moss (*Cetraria islandica*), ballroom dervish, and lesser green reindeer lichen (*Cladina mitis*) are the dominant species in the Lichen Tundra unit (Photo 4.1-14).

Photo 4.1-14 Ecological Land Classification Unit – Lichen Tundra



Heath Upland/Rock Complex: A transition between Heath Upland and rock features (bedrock outcrops or boulder fields), this unit is dominated by ericaceous shrub and lichen communities with rock or boulder substrate. The spectral signatures of this unit closely resemble, and therefore can be highly confused with, either parent communities (Photo 4.1-15).

Photo 4.1-15 Ecological Land Classification Unit – Heath Upland/Rock Complex

4.2.2 Distribution of Ecological Land Classification Units

The ELC developed for this baseline study provides a starting point for future analysis. For example, ELC units can be used to derive wildlife habitat suitability maps or to assess the quantity of different ELC units affected by future development.

The distribution of ELC units in the Mine LSA is illustrated in Figure 4.2-1 while ELC units in the RSA and along the access road LSAs are illustrated in Figure 4.2-2. The percentage breakdown of the ELC units found in the Mine LSA and RSA is compared in Table 4.2-2 and Figure 4.2-3A and B. The ELC units for each of the four access road options (North AWAR, South AWAR, Winter Access Road [South] and Winter Access Road [North]) are compared in Table 4.2-3 and Figure 4.2-4A to D.

Table 4.2-2 Percentages of Ecological Land Classification Units in the Mine Local Study Area and Regional Study Area

ELC Units	Mine LSA		RSA	
	hectare	%	hectare	%
Water	6,079	13.5	251,161	25.6
Disturbance	0	0	556	0.1
Cloud/Shadow	0	0	2,029	0.2
Sand	6	0	1,852	0.2
Gravel	83	0.2	6,979	0.7
Rock Association	40	0.1	10,130	1.0
Wet Graminoid	3,126	6.9	71,126	7.2
Graminoid Tundra	5,933	13.2	123,189	12.5
Graminoid/Shrub Tundra	4,626	10.3	79,603	8.1
Shrub Tundra	2,698	6.0	41,639	4.2
Shrub/Heath Tundra	3,716	8.3	59,255	6.0
Heath Tundra	16,216	36.0	241,679	24.6
Heath Upland	1,238	2.8	31,304	3.2
Heath Upland/Rock Complex	670	1.5	46,536	4.7
Lichen Tundra	578	1.3	15,820	1.6
Total	45,009	100	982,859	100

In both the Mine LSA and RSA, Heath Tundra is the most common ELC land unit, covering at least one-quarter of the land surface in both areas, although the Mine LSA does have a higher percentage of Heath Tundra than the RSA. The other main difference between the two study areas is that the RSA has over 10% more water cover, and over twice as much Heath Upland/Rock Complex. In general, the ELC analysis demonstrates the representativeness of the LSA. The second most common vegetated ELC unit is Graminoid Tundra, which is found in both study areas in similar amounts (around 13%). ELC units with less than one percent coverage in both the RSA and Mine LSA are the Disturbance, Sand, Gravel and Rock Association ELC units.

The breakdown of ELC units within the four road alignments located in the RSA are similar. Heath Tundra is the most common vegetated unit, with greatest coverage along the North AWAR. Graminoid Tundra is the next most common. As expected, both of the Winter Access Road LSAs have much more water coverage than the other access road LSAs. All four access road LSAs have low amounts of Disturbance, Sand, Gravel and Rock Association areas.

ELC units found within 100 m and 200 m of potential quarry sites are presented in Table 4.2-4 and Table 4.2-5, respectively. Potential quarry sites have been identified along the North AWAR and Winter Access Road (South). Quarry locations are included in Figure 4.2-5. The ELC breakdown for quarries will provide important information on habitat type and suitability for particular wildlife species when making decisions on what quarries will be developed in the future.

Table 4.2-3 Percentages of Ecological Land Classification Units along all Access Road Local Study Areas

ELC Units	North AWAR LSA		South AWAR LSA		Winter Access Road (South) LSA		Winter Access Road (North) LSA[(a)]	
	hectare	%	hectare	%	hectare	%	**hectare**	**%**
Water	7,655	14.7	8,710	16.3	20,827	37.1	8,681	29.2
Disturbance	76	0.1	0	0	0	0.0	0	0.0
Cloud/Shadow	86	0.2	198	0.4	203	0.4	51	0.2
Sand	32	0.1	85	0.2	248	0.4	13	0.0
Gravel	146	0.3	400	0.7	508	0.9	50	0.2
Rock Association	479	0.9	113	0.2	172	0.3	195	0.7
Wet Graminoid	3,118	6.0	5,771	10.8	5,490	9.8	2,136	7.2
Graminoid Tundra	9,144	17.6	9,189	17.2	8,269	14.7	4,691	15.8
Graminoid/Shrub Tundra	3,087	5.9	6,457	12.1	5,051	9.0	2,868	9.6
Shrub Tundra	1,694	3.3	1,747	3.3	1,776	3.2	1,049	3.5
Shrub/Heath Tundra	3,066	5.9	2,974	5.6	2,683	4.8	1,579	5.3
Heath Tundra	18,146	34.9	13,568	25.4	8,134	14.5	6,455	21.7
Heath Upland	1,287	2.5	1,519	2.8	952	1.7	413	1.4
Heath Upland/Rock Complex	3,159	6.1	1,903	3.6	1,097	2.0	1,195	4.0
Lichen Tundra	857	1.6	814	1.5	681	1.2	382	1.3
Total	52,032	100	53,448	100	56,091	100	29,758	100

(a) The Winter Access Road (North) is currently only considered as a partial segment connecting to other alignments.

Table 4.2-4 Ecological Land Classification Units within 100 m of Potential Quarry Sites

Quarry #	Unit	Water	Wet Graminoid	Graminoid Tundra	Graminoid/ Shrub Tundra	Shrub Tundra	Shrub/Heath Tundra	Heath Tundra	Heath Upland	Heath Upland/ Rock Complex	Lichen Tundra	Gravel	Rock
Q1	ha	0.00	0.06	0.01	0.00	0.00	0.00	0.39	0.02	2.30	0.00	0.00	0.38
	%	0.00	1.91	0.32	0.00	0.00	0.00	12.24	0.48	73.13	0.00	0.00	11.92
Q2	ha	0.00	0.00	0.00	0.00	0.00	0.00	0.39	0.26	2.31	0.00	0.00	0.19
	%	0.00	0.00	0.00	0.00	0.00	0.00	12.40	8.27	73.37	0.00	0.00	5.96
Q3	ha	0.00	0.13	0.13	0.00	0.00	0.00	0.80	0.68	1.14	0.04	0.24	0.00
	%	0.00	3.98	3.98	0.00	0.00	0.00	25.46	21.56	36.12	1.27	7.64	0.00
Q3A	ha	0.00	0.29	0.73	0.00	0.00	0.01	1.93	0.00	0.19	0.00	0.00	0.00
	%	0.00	9.30	23.05	0.00	0.00	0.32	61.37	0.00	5.96	0.00	0.00	0.00
Q4	ha	0.00	0.05	0.17	0.00	0.00	0.00	0.87	0.00	1.93	0.12	0.00	0.00
	%	0.00	1.59	5.34	0.00	0.00	0.00	27.81	0.00	61.51	3.75	0.00	0.00
Q5	ha	0.00	0.25	0.32	0.00	0.00	0.05	0.31	0.07	2.15	0.00	0.00	0.00
	%	0.00	7.95	10.10	0.00	0.00	1.43	9.94	2.31	68.28	0.00	0.00	0.00
Q6	ha	0.00	0.00	0.14	0.00	0.00	0.00	1.38	0.45	0.44	0.24	0.25	0.25
	%	0.00	0.00	4.30	0.00	0.00	0.00	43.98	14.26	13.94	7.57	7.97	7.97
Q7	ha	0.06	0.27	1.09	0.03	0.00	0.22	1.00	0.00	0.47	0.00	0.00	0.00
	%	1.99	8.43	34.77	1.03	0.00	6.92	31.82	0.00	15.04	0.00	0.00	0.00
Q8	ha	0.06	0.22	0.34	0.00	0.00	0.29	0.66	0.08	1.43	0.00	0.06	0.00
	%	1.83	7.09	10.68	0.00	0.00	9.32	21.04	2.47	45.58	0.00	1.99	0.00
Q9	ha	0.00	0.00	0.23	0.00	0.00	0.00	0.64	0.00	1.34	0.00	0.10	0.83
	%	0.00	0.00	7.26	0.00	0.00	0.00	20.33	0.00	42.66	0.00	3.19	26.56
Q10	ha	0.00	0.00	0.10	0.00	0.00	0.00	0.93	0.06	1.48	0.00	0.00	0.60
	%	0.00	0.00	3.24	0.00	0.00	0.00	29.38	1.74	46.60	0.00	0.00	19.04
Q11	ha	0.00	0.00	0.40	0.00	0.00	0.00	1.34	0.00	0.96	0.00	0.00	0.44
	%	0.00	0.00	12.83	0.00	0.00	0.00	42.71	0.00	30.52	0.00	0.00	13.94
Q12	ha	0.00	0.08	0.19	0.00	0.04	0.07	0.36	0.28	1.70	0.06	0.00	0.38
	%	0.00	2.47	5.89	0.00	1.27	2.07	11.30	8.91	54.18	1.99	0.00	11.93

Quarry #	Unit	Water	Wet Graminoid	Graminoid Tundra	Graminoid/ Shrub Tundra	Shrub Tundra	Shrub/Heath Tundra	Heath Tundra	Heath Upland	Heath Upland/ Rock Complex	Lichen Tundra	Gravel	Rock
Q13	ha	0.00	0.20	0.02	0.00	0.00	0.00	0.06	0.05	1.51	0.06	0.00	1.24
	%	0.00	6.28	0.64	0.00	0.00	0.00	1.99	1.51	48.13	1.99	0.00	39.46
Q14	ha	0.08	0.23	0.23	0.00	0.00	0.00	0.49	0.24	1.26	0.19	0.00	0.43
	%	2.47	7.42	7.34	0.00	0.00	0.00	15.47	7.58	40.11	5.98	0.00	13.64
Q15	ha	0.00	0.00	0.23	0.00	0.00	0.00	0.57	0.00	1.98	0.00	0.00	0.36
	%	0.00	0.00	7.24	0.00	0.00	0.00	18.22	0.00	63.09	0.00	0.00	11.46
Q16	ha	0.00	0.00	0.00	0.00	0.00	0.00	0.28	0.00	0.73	0.00	0.00	2.13
	%	0.00	0.00	0.00	0.00	0.00	0.00	8.91	0.00	23.31	0.00	0.00	67.78
Q16A	ha	0.00	0.28	0.52	0.00	0.00	0.00	1.12	0.00	1.13	0.08	0.00	0.00
	%	0.00	9.00	16.65	0.00	0.00	0.00	35.62	0.00	36.10	2.63	0.00	0.00
Q17	ha	0.00	0.13	0.00	0.00	0.00	0.00	0.30	0.00	2.73	0.00	0.00	0.02
	%	0.00	3.95	0.00	0.00	0.00	0.00	9.40	0.00	86.18	0.00	0.00	0.47
Q17A	ha	0.00	0.24	0.19	0.00	0.00	0.00	0.06	0.00	1.32	0.00	0.00	1.34
	%	0.00	7.56	5.89	0.00	0.00	0.08	1.99	0.00	41.93	0.00	0.00	42.56
Q17B	ha	0.12	0.44	0.44	0.00	0.00	0.00	0.72	0.15	0.90	0.06	0.00	0.31
	%	3.83	14.04	13.88	0.00	0.00	0.00	22.97	4.78	28.71	1.83	0.00	9.97
Q17C	ha	0.00	0.00	0.29	0.04	0.00	0.06	1.41	0.00	1.27	0.06	0.00	0.02
	%	0.00	0.00	9.22	1.19	0.00	1.99	44.83	0.00	40.30	1.99	0.00	0.48
Q18	ha	0.00	0.05	0.02	0.00	0.00	0.00	0.19	0.00	1.81	0.00	0.00	1.07
	%	0.00	1.59	0.72	0.00	0.00	0.00	5.98	0.00	57.53	0.00	0.00	34.18
Q19	ha	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	2.04	0.00	0.00	1.10
	%	0.00	0.00	0.00	0.00	0.00	0.00	0.16	0.00	65.00	0.00	0.00	34.84
Q20	ha	0.00	0.03	0.00	0.00	0.05	0.00	0.55	0.00	2.15	0.02	0.01	0.34
	%	0.00	0.88	0.08	0.00	1.43	0.00	17.42	0.00	68.42	0.64	0.40	10.74
Q21	ha	0.00	0.41	0.31	0.00	0.00	0.05	0.00	0.00	1.46	0.00	0.00	0.93
	%	0.00	12.87	9.85	0.00	0.00	1.51	0.00	0.00	46.39	0.00	0.00	29.39
Q22	ha	0.00	0.00	0.00	0.00	0.00	0.00	0.24	0.00	1.96	0.00	0.00	0.94
	%	0.00	0.00	0.00	0.00	0.00	0.00	7.72	0.00	62.26	0.00	0.00	30.02

Quarry #	Unit	Water	Wet Graminoid	Graminoid Tundra	Graminoid/ Shrub Tundra	Shrub Tundra	Shrub/Heath Tundra	Heath Tundra	Heath Upland	Heath Upland/ Rock Complex	Lichen Tundra	Gravel	Rock
Q23	ha	0.00	0.06	0.00	0.12	0.31	0.33	2.26	0.06	0.00	0.00	0.00	0.00
	%	0.00	1.91	0.00	3.91	9.73	10.37	72.09	1.99	0.00	0.00	0.00	0.00
Q24	ha	0.00	0.00	0.00	0.00	0.00	0.00	2.24	0.19	0.71	0.00	0.00	0.00
	%	0.00	0.00	0.08	0.00	0.00	0.00	71.36	5.97	22.59	0.00	0.00	0.00
Q25	ha	0.00	0.05	0.36	0.00	0.00	0.00	1.46	0.37	0.34	0.38	0.19	0.00
	%	0.00	1.43	11.54	0.00	0.00	0.00	46.38	11.85	10.74	12.09	5.97	0.00
Q26	ha	0.00	0.00	0.17	0.04	0.00	0.00	0.70	0.45	0.73	0.00	1.06	0.00
	%	0.00	0.00	5.42	1.20	0.00	0.00	22.15	14.26	23.19	0.00	33.78	0.00
Q27	ha	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.14
	%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00
Q28	ha	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.88	2.01	0.13	0.00	0.06
	%	0.00	0.00	0.00	0.00	0.00	0.00	1.99	27.91	64.11	3.99	0.00	1.99
Q29	ha	0.00	0.00	0.00	0.00	0.00	0.13	0.13	0.75	0.50	0.00	1.63	0.00
	%	0.00	0.00	0.00	0.00	0.00	4.00	4.00	24.00	16.00	0.00	52.00	0.00
Q30	ha	0.00	0.06	0.94	0.06	0.00	0.00	2.13	0.00	0.00	0.00	0.00	0.00
	%	0.00	1.96	29.41	1.96	0.00	0.00	66.67	0.00	0.00	0.00	0.00	0.00

ha = hectare

Table 4.2-5 Ecological Land Classification Units within 200 m of Potential Quarry Sites

Quarry #	Unit	Water	Wet Gram.	Gram. Tundra	Gram. / Shrub Tundra	Shrub Tundra	Shrub/ Heath Tundra	Heath Tundra	Heath Upland	Heath Upland/ Rock Complex	Lichen Tundra	Sand	Gravel	Rock
Q1	ha	0.00	0.06	0.49	0.16	0.01	0.00	4.71	0.36	6.10	0.31	0.00	0.00	0.38
	%	0.00	0.48	3.90	1.27	0.08	0.00	37.44	2.86	48.49	2.46	0.00	0.00	3.02
Q2	ha	0.00	0.00	0.13	0.00	0.00	0.06	4.04	2.32	5.18	0.55	0.00	0.00	0.31
	%	0.00	0.00	1.03	0.00	0.00	0.48	32.09	18.43	41.14	4.37	0.00	0.00	2.46
Q3	ha	0.00	0.26	0.21	0.00	0.00	0.01	4.79	3.30	2.69	0.16	0.01	1.00	0.15
	%	0.00	2.07	1.67	0.00	0.00	0.08	38.08	26.23	21.38	1.27	0.08	7.95	1.19
Q3A	ha	0.00	0.50	1.25	0.15	0.11	0.57	9.73	0.00	0.19	0.10	0.00	0.00	0.00
	%	0.00	3.97	9.92	1.19	0.87	4.52	77.22	0.00	1.51	0.79	0.00	0.00	0.00
Q4	ha	0.00	0.13	1.03	0.46	0.25	0.10	4.67	0.00	5.58	0.36	0.00	0.00	0.00
	%	0.00	1.03	8.19	3.66	1.99	0.79	37.12	0.00	44.36	2.86	0.00	0.00	0.00
Q5	ha	0.00	0.38	0.61	0.00	0.19	0.28	6.06	0.50	4.52	0.06	0.00	0.00	0.00
	%	0.00	3.02	4.84	0.00	1.51	2.22	48.10	3.97	35.87	0.48	0.00	0.00	0.00
Q6	ha	0.16	0.50	2.61	0.66	0.00	0.00	6.14	0.91	0.44	0.65	0.00	0.25	0.25
	%	0.00	0.48	3.90	1.27	0.08	0.00	37.44	2.86	48.49	2.46	0.00	0.00	3.02
Q7	ha	0.67	1.19	4.16	0.56	0.00	2.55	2.86	0.00	0.50	0.08	0.00	0.00	0.00
	%	5.33	9.47	33.09	4.46	0.00	20.29	22.75	0.00	3.98	0.64	0.00	0.00	0.00
Q8	ha	2.46	0.76	1.32	0.06	0.25	1.73	3.60	0.13	2.19	0.00	0.00	0.06	0.00
	%	19.59	6.05	10.51	0.48	1.99	13.77	28.66	1.04	17.44	0.00	0.00	0.48	0.00
Q9	ha	0.00	0.19	2.38	0.07	0.00	0.13	2.68	0.54	4.53	0.26	0.00	0.31	1.46
	%	0.00	1.51	18.96	0.56	0.00	1.04	21.35	4.30	36.10	2.07	0.00	2.47	11.63
Q10	ha	0.00	0.39	2.16	0.00	0.06	0.06	4.88	0.44	3.60	0.31	0.00	0.00	0.66
	%	0.00	3.11	17.20	0.00	0.48	0.48	38.85	3.50	28.66	2.47	0.00	0.00	5.25
Q11	ha	0.00	0.06	1.11	0.00	0.00	0.24	9.01	0.06	1.63	0.01	0.00	0.00	0.44
	%	0.00	0.48	8.84	0.00	0.00	1.91	71.74	0.48	12.98	0.08	0.00	0.00	3.50
Q12	ha	1.19	0.68	2.04	0.49	0.31	0.38	4.11	0.38	2.51	0.09	0.00	0.00	0.41
	%	9.45	5.40	16.20	3.89	2.46	3.02	32.64	3.02	19.94	0.71	0.00	0.00	3.26

Quarry #	Unit	Water	Wet Gram.	Gram. Tundra	Gram. / Shrub Tundra	Shrub Tundra	Shrub/ Heath Tundra	Heath Tundra	Heath Upland	Heath Upland/ Rock Complex	Lichen Tundra	Sand	Gravel	Rock
Q13	ha	0.00	1.41	2.34	0.26	0.00	0.13	1.92	0.13	4.48	0.06	0.00	0.00	1.85
	%	0.00	11.21	18.60	2.07	0.00	1.03	15.26	1.03	35.61	0.48	0.00	0.00	14.71
Q14	ha	0.19	1.00	2.01	0.14	0.00	0.00	2.27	1.12	4.39	0.23	0.00	0.15	1.07
	%	1.51	7.96	15.99	1.11	0.00	0.00	18.06	8.91	34.92	1.83	0.00	1.19	8.51
Q15	ha	0.00	0.06	2.87	0.16	0.00	0.00	4.29	0.08	3.78	0.07	0.00	0.00	1.25
	%	0.00	0.48	22.85	1.27	0.00	0.00	34.16	0.64	30.10	0.56	0.00	0.00	9.95
Q16	ha	0.00	0.32	0.77	0.22	0.00	0.00	2.72	0.20	4.50	0.06	0.00	0.00	3.80
	%	0.00	2.54	6.12	1.75	0.00	0.00	21.60	1.59	35.74	0.48	0.00	0.00	30.18
Q16A	ha	0.00	0.77	3.81	0.23	0.00	0.00	4.08	0.04	3.40	0.25	0.00	0.00	0.00
	%	0.00	6.12	30.29	1.83	0.00	0.00	32.43	0.32	27.03	1.99	0.00	0.00	0.00
Q17	ha	0.00	0.13	0.08	0.00	0.00	0.02	3.02	0.08	8.37	0.05	0.00	0.00	0.83
	%	0.00	1.03	0.64	0.00	0.00	0.16	24.01	0.64	66.53	0.40	0.00	0.00	6.60
Q17A	ha	0.00	0.50	2.61	0.22	0.00	0.13	1.68	0.07	5.31	0.06	0.00	0.00	1.99
	%	0.00	3.98	20.76	1.75	0.00	1.03	13.37	0.56	42.24	0.48	0.00	0.00	15.83
Q17B	ha	0.56	1.28	2.84	0.06	0.06	0.04	5.23	0.31	1.56	0.30	0.00	0.00	0.31
	%	4.46	10.20	22.63	0.48	0.48	0.32	41.67	2.47	12.43	2.39	0.00	0.00	2.47
Q17C	ha	0.00	0.13	1.76	0.21	0.06	0.19	6.91	0.00	2.78	0.49	0.00	0.00	0.06
	%	0.00	1.03	13.98	1.67	0.48	1.51	54.88	0.00	22.08	3.89	0.00	0.00	0.48
Q18	ha	0.00	0.94	1.78	0.15	0.00	0.08	2.16	0.09	6.13	0.00	0.00	0.00	1.24
	%	0.00	7.48	14.16	1.19	0.00	0.64	17.18	0.72	48.77	0.00	0.00	0.00	9.86
Q19	ha	0.00	0.08	0.84	0.00	0.00	0.06	3.25	0.14	5.96	0.09	0.00	0.00	2.14
	%	0.00	0.64	6.69	0.00	0.00	0.48	25.88	1.11	47.45	0.72	0.00	0.00	17.04
Q20	ha	0.00	0.65	1.12	0.31	0.31	0.23	2.21	0.88	4.73	0.06	0.00	0.50	1.58
	%	0.00	5.17	8.90	2.46	2.46	1.83	17.57	7.00	37.60	0.48	0.00	3.97	12.56
Q21	ha	0.00	1.45	1.70	0.04	0.00	0.19	0.32	0.14	6.65	0.01	0.00	0.00	2.08
	%	0.00	11.53	13.51	0.32	0.00	1.51	2.54	1.11	52.86	0.08	0.00	0.00	16.53
Q22	ha	0.05	0.46	0.25	0.00	0.00	0.00	1.02	1.16	6.86	0.00	0.00	0.05	2.75
	%	0.40	3.65	1.98	0.00	0.00	0.00	8.10	9.21	54.44	0.00	0.00	0.40	21.83

Quarry #	Unit	Water	Wet Gram.	Gram. Tundra	Gram. / Shrub Tundra	Shrub Tundra	Shrub/ Heath Tundra	Heath Tundra	Heath Upland	Heath Upland/ Rock Complex	Lichen Tundra	Sand	Gravel	Rock
Q23	ha	0.00	0.14	0.16	0.80	0.94	1.33	9.12	0.06	0.00	0.00	0.00	0.00	0.00
	%	0.00	1.12	1.27	6.37	7.49	10.60	72.67	0.48	0.00	0.00	0.00	0.00	0.00
Q24	ha	0.20	0.24	0.75	0.14	0.06	0.01	8.74	1.14	1.06	0.22	0.00	0.00	0.00
	%	1.59	1.91	5.97	1.11	0.48	0.08	69.59	9.08	8.44	1.75	0.00	0.00	0.00
Q25	ha	0.00	0.06	2.00	0.00	0.00	0.00	7.02	1.00	0.51	1.79	0.00	0.19	0.00
	%	0.00	0.48	15.91	0.00	0.00	0.00	55.85	7.96	4.06	14.24	0.00	1.51	0.00
Q26	ha	0.00	0.00	0.76	1.25	0.15	0.14	4.84	2.36	1.28	0.44	0.00	1.35	0.00
	%	0.00	0.00	6.05	9.94	1.19	1.11	38.50	18.77	10.18	3.50	0.00	10.74	0.00
Q27	ha	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.56	0.00	0.00	0.00	0.00	11.81
	%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.55	0.00	0.00	0.00	0.00	95.45
Q28	ha	0.00	0.00	0.06	0.13	0.06	0.06	1.38	1.88	8.50	0.13	0.00	0.00	0.38
	%	0.00	0.00	0.50	1.00	0.50	0.50	10.95	14.93	67.66	1.00	0.00	0.00	2.99
Q29	ha	0.00	0.00	0.00	0.00	0.00	0.13	0.50	6.13	1.56	0.44	0.00	3.75	0.06
	%	0.00	0.00	0.00	0.00	0.00	1.00	3.98	48.76	12.44	3.48	0.00	29.85	0.50
Q30	ha	0.00	0.13	2.81	0.81	0.00	0.00	8.56	0.25	0.00	0.06	0.00	0.00	0.00
	%	0.00	0.99	22.28	6.44	0.00	0.00	67.82	1.98	0.00	0.50	0.00	0.00	0.00

ha = hectare

4.2.3 Plant Species

4.2.3.1 Overview of Plant Species Presence

Field surveys have identified 199 plant species and 74 lichen species in the Kiggavik RSA since 1979 (see complete listing of all species observed in Attachment D).The list includes hybrids and intergrades, but not species identified only to genus level. Field observations on plant abundance, diversity and health within the Project LSAs and anticipated footprints indicate that these variables are consistent with what would be expected in similar habitats/areas in the RSA and surrounding Arctic environments.

The most recent surveys completed in 2008/09 identified 116 vascular plant species, as well as 32 species of lichens and fungi (these totals include any individual plant identifications, even to genus level only). Of these plants, the following species were identified for the first time (see Attachment D for species details):

- four shrub/heath species;
- fifteen forb species;
- ten graminoid species;
- one fern; and
- eight lichens.

Plant species observed in the different ELC units are detailed in Attachment E. The total number of plant species and the average number of species per survey plot are summarized in Table 4.2-6 for each of the surveyed ELC units. In terms of species diversity, Graminoid Tundra has the highest average number of species, and Gravel has the lowest. Also included in Table 4.2-6 are some historic data on total number of species. A direct comparison between historical and current data is difficult because of differences in methods and study areas.

Table 4.2-6 Summary of Plant Species Presence by Ecological Land Classification Unit (2008/09)

ELC Unit	Total # Species	Average # Species per Survey Plot	Number of Survey Plots
Water	ND	ND	0
Disturbance	ND	ND	0
Cloud/Shadow	ND	ND	0
Sand	ND	ND	0
Gravel	25	10.8	5
Rock Association	55	13.3	19
Wet Graminoid	75	12.0	42
Graminoid Tundra	99	23.2	46
Graminoid/Shrub Tundra	64	15.6	21
Shrub Tundra	83	15.9	42
Shrub/Heath Tundra	69	20.3	19
Heath Tundra	96	19.3	66
Heath Upland	86	18.3	47
Heath Upland/Rock Complex	75	15.5	55
Lichen Tundra	37	17.7	12
Total (2008/2009)	148	ND	ND
Total (1991)[a]	178	ND	ND
Total (1990)[b]	62	ND	ND
Total (1987-1989)	137	ND	ND
Total (pre 1987)	86	ND	ND

[a] Identification of some lichen species not confirmed

[b] Sissons area only

ND = No data

4.2.3.2 Inuit Quajimajatuqangit

Inuit Quajimajatuqangit (IQ) studies completed as part of the baseline program discussed the use of certain plant species as food, medicine, shelter, and other human uses. During focus group discussions, Elders noted that a number of sweet plants were harvested for food (BLE 2009). Cowberries (likely *Vaccinium vitis-idaea*]), blueberries, cloudberries (likely *Rubus chamaemorus*), ‘black’ berries (likely *Empetrum nigrum*) and ‘red’ berries (latin name uncertain) were gathered in the past and are still used today. Dried cloudberry leaves are used to make tea and roots of certain bushes were used to cure stomach aches. Edible purple flowers (possibly saxifrage) are consumed as are certain roots that are white and taste like carrots (latin name unknown) and a tundra moss (latin name unknown) is boiled to make a hot beverage (CIYA 2009). Elders commented during focus groups that traditional cures were no longer used (BLE 2009).

IQ interviews did not identify particular places for collecting plants; rather it was noted that plants were everywhere. The area around Sissons Lake was noted to be particularly good for red berries (BLE 2009). Plants are typically gathered by Elders from August to September.

An AREVA diet survey contacted a total of 189 residents in 2009/10, representing 89 households (20% of all households, or 23% of the total adult population in Baker Lake) (see Technical Appendix 9A of this EIS). The survey was completed to estimate consumption levels of country foods as well as associated values for Baker Lake residents. The study estimated that 40% of households are engaged in plant collecting, although most households (87%) are likely not engaged regularly (one a day or two every now and then, likely during day trips and weekends). The study noted that this type of occasional involvement did not reflect a low level of commitment or harvesting. Almost seven percent of households indicated they had purchased wild berries over the course of the year.

4.2.3.3 Rare Plants and Plant Communities

Rare and endangered species are ranked federally through the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and the *Species at Risk Act* (*SARA*). COSEWIC is an arms-length committee of experts that designates rare species as being Extinct, Extirpated, Endangered, Threatened, or of Special Concern. Extinct species no longer exist anywhere in the world, whereas Extirpated species no longer exist in the wild in Canada, but occur elsewhere. Endangered species face imminent extirpation or extinction, Threatened species are likely to become endangered if limiting factors are not reversed, and species of Special Concern are particularly sensitive to human activities or natural events but are not yet Endangered or Threatened. *SARA* officially lists certain species ranked by COSEWIC on Schedule 1, which requires measures to be implemented that protect and recover the listed species. Only species that have been formally added to Schedule 1 receive full federal protection. If a Schedule 1 species is identified in a development project, special measures to protect and recover such a listed species would be required for projects reviewed under territorial and federal review processes.

SARA Schedule 2 and 3 identify species that need to be assessed by COSEWIC within a particular timeframe. These species are not yet legally protected under *SARA*, but are of special concern from a wildlife management perspective. Within a project review process, Schedule 2 and 3 species may require proactive special measures in case their status changes and they become legally protected under *SARA* Schedule 1.

Species at risk or of concern according to relevant territorial and federal listings are presented in Table 4.2-7. Only two plant species listed under the *SARA* are found in Nunavut, and neither of these species is assumed to have been observed to date (see Table 4.2-7). Felt-leaf willow (listed as *Salix alaxensis*) was observed in 2008/09 surveys, and has also likely been observed in the Kiggavik RSA in the past (the species name was noted as being observed in pre-1989 vegetation surveys, although the common name was identified as ‘river willow’ [see Attachment D]). Although the common name is the same, the *SARA* Schedule 1 listing for felt-leaf willow is for *Salix salicola*. Presumably the plant observed in the Kiggavik RSA is a different species.

Species listed under Schedule 1 require legal protection. No other plant species identified by *SARA* and COSEWIC has been recorded in the LSAs or RSA during any of the Kiggavik studies or for the adjacent Meadowbank Project to date. Although it is possible that some rare non-vascular species (e.g., lichens) may be present, very little is known of non-vascular plant distribution in the Arctic, and most species are difficult to identify.

Seven vascular plant species of restricted range are known or expected to occur in the area (Cody 1979; McJannet et al. 1993, 1995), but none are considered to be rare or of special concern: greyleaf willow (*Salix glauca*), mountain heather (*Phyllodoce breweri*), alpine pussytoes (*Antennaria alpine*), marsh marigold (*Caltha palustris*), Rocky Mountain cinquefoil (*Potentilla rubricaulis*), Bell's crazyweed (*Oxytropis arctica* var. *bellii*) and diapensia (*Diapensia lapponica*). The latter two species were recorded during field surveys in the Kiggavik RSA. Bell's crazyweed was observed near Schultz Lake, and diapensia was observed in a survey plot in the Mine LSA (Figure 4.2-6).

Table 4.2-7 Species at Risk Observed or Expected in Kiggavik Regional Study Area

Plant Species	Scientific Name	Presence in Kiggavik RSA	COSEWIC Status[(a)]	SARA Status[(b)]
Felt-leaf Willow	*Salix salicicola*	Not likely[(c)]	Special Concern	Schedule 1
Porsild's Bryum	*Mielichhoferia macrocarpa*	Not observed	Threatened	Threatened

(a) COSEWIC 2009, internet site

(b) *SARA* 2009, internet site

(c) Felt-leaf willow has been reported, but was identified under the scientific name *Salix alaxensis*, presumably a different species than the above (reported in pre-1987 data [Beak 1987b], for surveys in 1987/89 [Wickware 1989], and in 2008/09 field surveys)

4.2.4 Plant Tissue Chemistry

Plant tissue collected from 2007 to 2009 was analyzed for metals and radionuclides in individual tissue types. Sampled tissue included primarily sedge, lichen, and berry as well as some 2007 foliage samples collected from birch, willow and blueberry bush. Mean concentrations for each tissue type are summarized in Table 4.2-8A to D, for Mine LSA samples (collected in 2007/08) and RSA samples (collected in 2009). Complete vegetation chemistry data are provided in Attachment F.

Because of differences in sampling and analytical methods, measured parameters, composited samples, and the incompleteness of some available datasets, comparisons to available historical data are limited. The current dataset collected from 2007 to 2009 provides more relevant information on baseline conditions that can be used in future assessments. A summary of historical plant chemistry data is presented in Table 4.2-9. Sampling in the mid-1980s measured elevated radium-226 (and other radionuclides) activity in plant tissue samples, near ore body showings in the Mine LSA. Elevated activities appeared to be limited to the immediate area around the showing (Svobada et al. 1985).

Table 4.2-8A Plant Tissue Chemistry Data (Berries) for Mine Local Study Area and Regional Study Area (2007-2009)

Parameter	Units	Mine LSA (2007/08)					RSA (2009)				
		n	Mean	SD	Range		n	Mean	SD	Range	
					Min	Max				Min	Max
Aluminum	ug/g	50	7.2	14	<2	75.2	2	5.1	2.1	3.6	6.5
Antimony	ug/g	50	0.010	0.015	<0.010	<0.10	2	0.050	0	<0.1	<0.1
Arsenic	ug/g	50	0.0078	0.0071	<0.010	0.026	2	0.025	0	<0.05	<0.05
Barium	ug/g	50	4.4	6.4	0.813	27	2	10	0.78	9.9	11
Beryllium	ug/g	50	0.045	0.015	<0.01	<0.10	2	0.0050	0	<0.01	<0.01
Boron	ug/g	6	27	17	14	60	2	5.0	0	5	5
Cadmium	ug/g	50	0.037	0.078	<0.005	0.36	2	0.013	0.011	<0.01	0.02
Chromium	ug/g	50	0.46	0.92	<0.10	4.94	2	0.25	0	<0.5	<0.5
Cobalt	ug/g	50	0.017	0.016	<0.02	0.067	2	0.023	0.025	<0.01	0.04
Copper	ug/g	50	1.2	1.4	0.537	7	2	4.4	0.14	4.3	4.5
Iron	ug/g	6	17	6.6	12	30	2	10	0	10	10
Lead	ug/g	50	0.012	0.0077	<0.01	0.05	2	0.030	0	0.03	0.03
Manganese	ug/g	50	50	69	6.07	310	2	75	21	60	90
Mercury	ug/g	50	0.0034	0.0080	<0.0010	<0.05	ND	ND	ND	ND	ND
Molybdenum	ug/g	50	0.092	0.22	<0.010	1.5	2	0.075	0.035	<0.1	0.1
Nickel	ug/g	50	0.51	0.65	<0.1	2.99	2	0.70	0.29	0.49	0.9
Selenium	ug/g	50	0.091	0.025	<0.05	<0.20	2	0.025	0	<0.05	<0.05
Silver	ug/g	6	0.0050	0	<0.01	<0.01	2	0.005	0	<0.1	<0.1
Strontium	ug/g	50	0.92	1.4	0.179	7.2	2	11	7.4	5.6	16
Thallium	ug/g	50	0.0074	0.0066	<0.010	<0.05	2	0.025	0	<0.05	<0.05
Tin	ug/g	50	0.11	0.062	<0.05	0.336	2	0.025	0	<0.05	<0.05
Titanium	ug/g	6	0.25	0.28	0.06	0.79	2	0.19	0.078	0.13	0.24
Uranium	ug/g	50	0.0017	0.0015	<0.002	0.0059	2	0.0050	0	<0.01	<0.01
Vanadium	ug/g	50	0.050	0	<0.1	<0.1	2	0.050	0	<0.1	0.1
Zinc	ug/g	50	17	12	1.31	40.4	2	8.9	1.6	7.8	10
Bismuth	ug/g	44	0.015	0	<0.03	<0.03	ND	ND	ND	ND	ND
Calcium	ug/g	44	273	100	88.6	479	ND	ND	ND	ND	ND

Parameter	Units	Mine LSA (2007/08)					RSA (2009)				
		n	Mean	SD	Range		n	Mean	SD	Range	
					Min	Max				Min	Max
Lithium	ug/g	44	0.050	0	<0.10	<0.10	ND	ND	ND	ND	ND
Magnesium	ug/g	44	84	11	51.2	108	ND	ND	ND	ND	ND
Moisture	%	50	87	1.2	84.7	89.8	2	82	2.5	80.65	84.19
Lead-210	Bq/g	16	0.0071	0.0044	<0.002	0.014	2	0.060	0.041	0.031	0.089
Polonium-210	Bq/g	16	0.0068	0.0039	0.002	0.014	2	0.0085	0.0035	0.006	0.011
Radium-226	Bq/g	16	0.0011	0.0009	<0.0005	0.004	2	0.0020	0	0.002	0.002
Thorium-230	Bq/g	16	0.0017	0.0010	<0.0004	<0.005	2	0.0010	0	<0.002	<0.002
Thorium-232	Bq/g	10	0.0025	0.0002	<0.004	<0.005	2	0.0010	0	<0.002	<0.002

Data are for samples collected at locations indicated in Figure 4.1-2.
All 2007 LSA samples run individually for both metals and radionuclide analysis.
All 2008 LSA samples run individually for metals analysis; 44 LSA berry samples were combined into 10 composite samples for radionuclide analysis; 100 LSA sedge/lichen samples from 2008 were combined into 35 composite samples and 20 discrete samples for radionuclide analysis.
All 2009 RSA samples run individually for metals and radionuclide analysis.
ND = No data
n = Sample size
SD = Standard deviation

Table 4.2-8B Plant Tissue Chemistry Data (Lichen) for Mine Local Study Area and Regional Study Area (2007-2009)

Parameter	Units	Mine LSA (2007/08)					RSA (2009)				
		n	Mean	SD	Range		n	Mean	SD	Range	
					Min	Max				Min	Max
Aluminum	ug/g	56	178	276	16	1640	10	116	72	66	310
Antimony	ug/g	56	0.021	0.011	<0.020	<0.10	10	0.050	0	<0.1	<0.1
Arsenic	ug/g	56	0.091	0.069	<0.020	0.405	10	0.051	0.028	<0.05	0.09
Barium	ug/g	56	47	33	10.1	243	10	55	34	19	130
Beryllium	ug/g	56	0.16	0.061	<0.01	<0.40	10	0.015	0.015	<0.01	0.05
Boron	ug/g	6	2.5	0.55	2	3	10	0.70	0.26	<1	1
Cadmium	ug/g	56	0.11	0.059	0.019	0.296	10	0.10	0.055	0.03	0.21
Chromium	ug/g	56	1.4	3.0	<0.2	17.9	10	0.25	0	<0.5	<0.5
Cobalt	ug/g	56	0.25	0.55	<0.060	3.84	10	0.15	0.11	0.05	0.37
Copper	ug/g	56	2.1	1.1	0.6	6.19	10	1.2	0.51	0.56	2.4
Iron	ug/g	6	160	97	78	310	10	126	122	50	470
Lead	ug/g	56	0.69	1.0	0.104	6.96	10	0.77	0.80	0.29	3
Manganese	ug/g	56	199	119	27	652	10	202	73	90	350
Mercury	ug/g	56	0.035	0.023	0.0041	0.1	ND	ND	ND	ND	ND
Molybdenum	ug/g	56	0.28	0.52	<0.030	3.41	10	0.055	0.016	<0.1	0.1
Nickel	ug/g	56	1.3	1.6	<0.30	9.09	10	0.49	0.25	0.21	0.94
Selenium	ug/g	56	0.32	0.12	<0.05	<0.80	10	0.025	0	<0.05	<0.05
Silver	ug/g	6	0.034	0.049	<0.01	0.13	10	0.0085	0.0078	<0.01	0.03
Strontium	ug/g	56	13	6.8	4.17	44.5	10	33	32	6.8	100
Thallium	ug/g	56	0.019	0.0078	<0.020	0.069	10	0.025	0	<0.05	<0.05
Tin	ug/g	56	0.083	0.024	<0.05	<0.20	10	0.047	0.058	<0.05	0.21
Titanium	ug/g	6	6.5	3.2	3.2	11	10	4.8	4.4	2.2	17
Uranium	ug/g	56	0.37	2.4	<0.006	18.1	10	0.014	0.011	<0.01	0.04
Vanadium	ug/g	56	0.36	0.66	<0.20	4.67	10	0.20	0.15	<0.1	0.6
Zinc	ug/g	56	28	9.2	10.9	60	10	19	3.6	13	24
Bismuth	ug/g	50	0.067	0.10	<0.060	0.726	ND	ND	ND	ND	ND

Parameter	Units	Mine LSA (2007/08)					RSA (2009)				
		n	Mean	SD	Range		n	Mean	SD	Range	
					Min	Max				Min	Max
Calcium	ug/g	50	3431	1663	933	10700	ND	ND	ND	ND	ND
Lithium	ug/g	50	0.30	0.62	<0.20	4.34	ND	ND	ND	ND	ND
Magnesium	ug/g	50	532	156	212	1080	ND	ND	ND	ND	ND
Moisture	%	56	34	20	9.98	68	ND	ND	ND	ND	ND
Lead-210	Bq/g	34	0.45	0.085	0.26	0.64	10	0.58	0.068	0.48	0.71
Polonium-210	Bq/g	34	0.40	0.079	0.15	0.58	10	0.53	0.11	0.36	0.65
Radium-226	Bq/g	34	0.010	0.030	<0.001	0.18	10	0.0045	0.0031	<0.001	0.011
Thorium-230	Bq/g	34	0.0095	0.041	<0.0005	0.24	10	0.0020	0.0014	<0.003	0.006
Thorium-232	Bq/g	28	0.0025	0	<0.005	<0.005	10	0.0015	0	<0.003	<0.003

Data are for samples collected at locations indicated in Figure 4.1-2.
All 2007 LSA samples run individually for both metals and radionuclide analysis.
All 2008 LSA samples run individually for metals analysis; 44 LSA berry samples were combined into 10 composite samples for radionuclide analysis; 100 LSA sedge/lichen samples from 2008 were combined into 35 composite samples and 20 discrete samples for radionuclide analysis.
All 2009 RSA samples run individually for metals and radionuclide analysis.
ND = No data
n = Sample size
SD = Standard deviation

Table 4.2-8C Plant Tissue Chemistry Data (Sedges) for Mine Local Study Area and Regional Study Area (2007-2009)

Parameter	Units	Mine LSA (2007/08)					RSA (2009)				
		n	Mean	SD	Range		n	Mean	SD	Range	
					Min	Max				Min	Max
Aluminum	ug/g	56	65	116	3.4	839	10	59	40	1.4	140
Antimony	ug/g	56	0.016	0.012	<0.02	<0.10	10	0.050	0	<0.1	<0.1
Arsenic	ug/g	56	0.057	0.091	<0.02	0.51	10	0.034	0.019	<0.05	0.07
Barium	ug/g	56	36	21	8.51	97	10	71	29	8.9	110
Beryllium	ug/g	56	0.10	0.044	<0.01	<0.40	10	0.012	0.014	<0.01	0.05
Boron	ug/g	6	9.0	3.3	5	15	10	3.3	2.2	<1	7
Cadmium	ug/g	56	0.045	0.032	<0.01	0.171	10	0.066	0.050	<0.01	0.18
Chromium	ug/g	56	1.1	3.2	<0.20	22.8	10	0.25	0	<0.5	<0.5
Cobalt	ug/g	56	0.16	0.19	0.02	0.868	10	0.15	0.094	<0.01	0.29
Copper	ug/g	56	2.2	0.91	0.602	4.4	10	2.4	1.1	0.37	4.3
Iron	ug/g	6	112	101	16	300	10	87	53	4.8	220
Lead	ug/g	56	0.19	0.20	0.02	0.947	10	0.41	0.20	0.02	0.71
Manganese	ug/g	56	159	108	39.9	560	10	400	306	50	1100
Mercury	ug/g	56	0.012	0.010	0.002	0.0445	ND	ND	ND	ND	ND
Molybdenum	ug/g	56	0.57	0.89	<0.02	4.8	10	0.58	0.32	0.05	1.1
Nickel	ug/g	56	1.1	1.7	0.24	12.5	10	0.81	0.43	0.06	1.6
Selenium	ug/g	56	0.21	0.085	<0.05	<0.80	10	0.025	0	<0.05	<0.05
Silver	ug/g	6	0.025	0.033	<0.01	0.09	10	0.0050	0	<0.01	<0.01
Strontium	ug/g	56	8.4	5.0	1.99	25.1	10	35	35	1.6	110
Thallium	ug/g	56	0.013	0.0050	<0.02	<0.05	10	0.025	0	<0.05	<0.05
Tin	ug/g	56	0.068	0.10	<0.05	0.82	10	0.025	0	<0.05	<0.05
Titanium	ug/g	6	0.68	1.0	0.11	2.7	10	1.7	1.8	0.06	6
Uranium	ug/g	56	0.44	2.1	<0.004	13.9	10	0.016	0.013	<0.01	0.04
Vanadium	ug/g	56	0.17	0.24	<0.10	1.73	10	0.080	0.079	<0.1	0.3
Zinc	ug/g	56	19	14	6.89	100	10	42	23	3.6	70
Bismuth	ug/g	50	0.035	0.0088	<0.06	<0.12	ND	ND	ND	ND	ND

Parameter	Units	Mine LSA (2007/08)					RSA (2009)				
		n	Mean	SD	Range		n	Mean	SD	Range	
					Min	Max				Min	Max
Calcium	ug/g	50	1767	963	542	5960	ND	ND	ND	ND	ND
Lithium	ug/g	50	0.14	0.12	<0.20	0.89	ND	ND	ND	ND	ND
Magnesium	ug/g	50	413	121	183	740	ND	ND	ND	ND	ND
Moisture	%	56	53	13	15.6	70.67	ND	ND	ND	ND	ND
Lead-210	Bq/g	33	0.18	0.12	0.007	0.46	10	0.32	0.092	0.14	0.43
Polonium-210	Bq/g	33	0.14	0.083	0.012	0.29	10	0.26	0.078	0.12	0.38
Radium-226	Bq/g	33	0.014	0.045	0.001	0.26	10	0.0047	0.0025	<0.001	0.008
Thorium-230	Bq/g	33	0.0075	0.021	<0.0005	0.12	10	0.0014	0.0009	<0.002	0.004
Thorium-232	Bq/g	27	0.0034	0.0036	<0.004	0.02	10	0.0011	0.0002	<0.002	<0.003

Data are for samples collected at locations indicated in Figure 4.1-2.
All 2007 LSA samples run individually for both metals and radionuclide analysis.
All 2008 LSA samples run individually for metals analysis; 44 LSA berry samples were combined into 10 composite samples for radionuclide analysis; 100 LSA sedge/lichen samples from 2008 were combined into 35 composite samples and 20 discrete samples for radionuclide analysis.
All 2009 RSA samples run individually for metals and radionuclide analysis.
ND = No data
n = Sample size
SD = Standard deviation

Table 4.2-8D Plant Tissue Chemistry Data (Foliage) for Mine Local Study Area (2007)

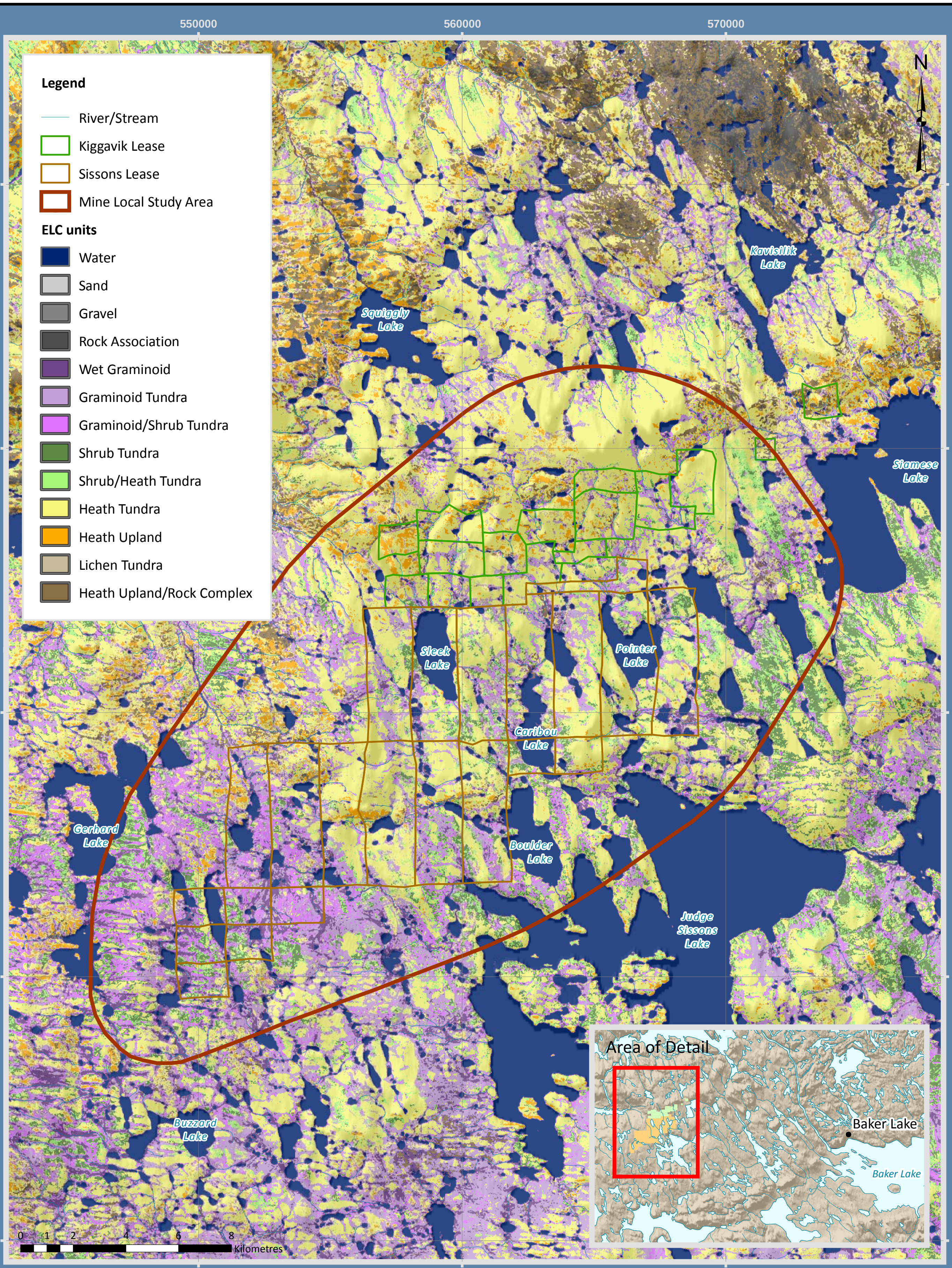
Parameter	Units	n	Mean	SD	Range	
					Min	Max
Aluminum	ug/g	18	33	25	8.6	100
Antimony	ug/g	18	0.050	0	<0.1	<0.1
Arsenic	ug/g	18	0.031	0.025	<0.05	0.13
Barium	ug/g	18	87	30	55	160
Beryllium	ug/g	18	0.0050	0	<0.01	<0.01
Boron	ug/g	18	12	3.6	9	21
Cadmium	ug/g	18	1.2	1.5	0.08	5
Chromium	ug/g	18	0.27	0.082	<0.5	0.6
Cobalt	ug/g	18	0.42	0.30	0.05	1
Copper	ug/g	18	6.8	2.1	4.3	12
Iron	ug/g	18	28	5.2	22	37
Lead	ug/g	18	0.11	0.058	0.04	0.21
Manganese	ug/g	18	488	302	100	1300
Mercury	ug/g	18	0.025	0	<0.05	<0.05
Molybdenum	ug/g	18	0.12	0.16	<0.1	0.6
Nickel	ug/g	18	1.8	1.0	0.57	4.1
Selenium	ug/g	18	0.025	0	<0.05	<0.05
Silver	ug/g	18	0.011	0.014	<0.01	0.05
Strontium	ug/g	18	18	13	5	47
Thallium	ug/g	18	0.025	0	<0.05	<0.05
Tin	ug/g	18	0.027	0.0082	<0.05	0.06
Titanium	ug/g	18	4.2	12	0.3	49
Uranium	ug/g	18	0.0053	0.0012	<0.01	0.01
Vanadium	ug/g	18	0.16	0.41	<0.1	1.8
Zinc	ug/g	18	132	98	32	380
Bismuth	ug/g	ND	ND	ND	ND	ND
Calcium	ug/g	ND	ND	ND	ND	ND
Lithium	ug/g	ND	ND	ND	ND	ND
Magnesium	ug/g	ND	ND	ND	ND	ND
Moisture	%	18	53	3.0	48.25	58.63
Lead-210	Bq/g	18	0.11	0.028	0.057	0.16
Polonium-210	Bq/g	18	0.089	0.025	0.045	0.13
Radium-226	Bq/g	18	0.0043	0.0029	0.0012	0.014
Thorium-230	Bq/g	18	0.00063	0.0004	<0.0004	0.002
Thorium-232	Bq/g	ND	ND	ND	ND	ND

Data are for samples collected at locations indicated in Figure 4.1-2.
All samples run individually for both metals and radionuclide analysis.
Samples consisted of foliage collected from willow, birch and blueberry bush.
ND = No data
n = Sample size
SD = Standard deviation

Table 4.2-9 Summary of Historic Plant Tissue Chemistry Studies in the Mine Local Study Area and Regional Study Area

Year (original reference)	Location	Plant Type	Parameters	Concentration Ranges (for parameters included in Table 4.2-8)
1979 (Speller et al. 1979)	LSA	Lichens	Metals, radionuclides	(data not available)
	RSA	Lichens	Metals, radionuclides	(data not available)
1983 (Kershaw et al. 1983)	LSA (transects)	Lichens (*Dactylina arctica, Cetraria cucullata, cetraria nivalis*)	Metals, radionuclides	Iron: 25 to 200 ug/g Titanium: 3 to 35 ug/g Lead: 1 to 14 ug/g Nickel: 1 to 6 ug/g Copper: 4 to 7 ug/g Uranium: <1 ug/g
1985 (Svobada et al. 1985)	LSA (near ore body)	Berries (*Arctostaphylos alpine, Vaccinium uliginosum, V. visis-idaea, Empetrum nigrum*)	Radionuclides	Radium-226: 1.4 (±1.7) to 20.05 (±2.29) Bg/g
		Lichens (species not identified)	Radionuclides	Radium-226: <DL to 2.2 (±0.27)
		Sedges (species not identified)	Radionuclides	Radium-226: 0.09 (±0.09) to 34.52 (±3.96)
	LSA (transects)	Composite samples	Radionuclides	N/A
	RSA (various areas)	Composite samples	Radionuclides	N/A
1988 (Beak 1988)	LSA	Composite samples	Metals	N/A
	RSA (Skinny Lake)	Composite samples	Metals	N/A
1991 (Geomatics 1991)	Mine LSA (upwind, downwind)	Lichens	Radionuclides	(data not available)

DL = Detection limit
N/A = Not applicable (composite samples are not comparable to current baseline dataset)



Projection: NAD 1983 UTM Zone 14N
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Date: 01/11/2011 Scale: 1:200,000
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Data Sources: Natural Resources Canada, GeoBase®, National Topographic Database, AREVA Resources Canada Inc., and Gebauer & Associates.

FIGURE 4.2-1
ECOLOGICAL LAND CLASSIFICATION UNITS IN THE MINE LOCAL STUDY AREA

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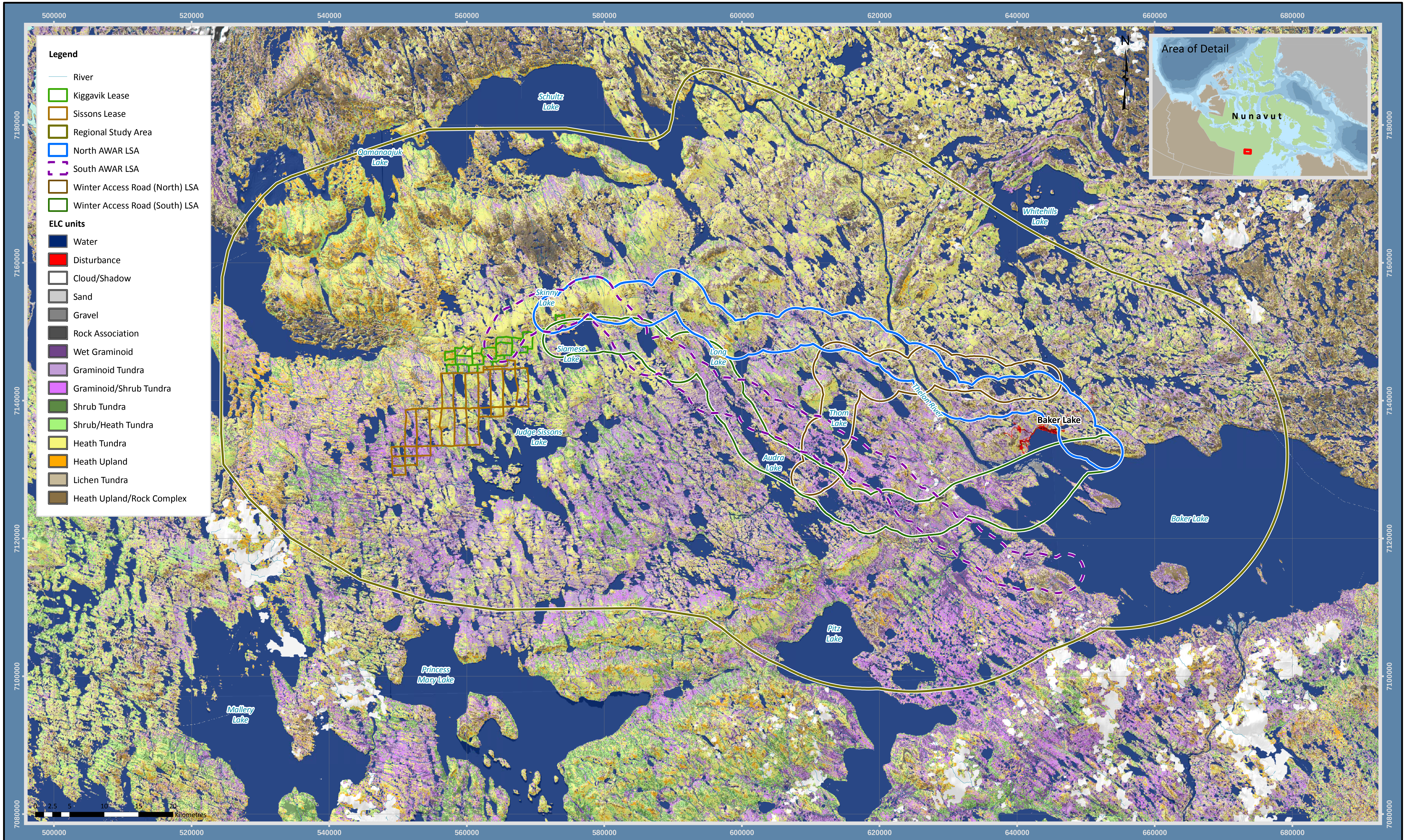
Gebauer & Associates ENVIRONMENTAL CONSULTANTS
CASLYS CONSULTING
AREVA

AREVA Resources Canada Inc - P.O. Box 9204 - 817 - 45th Street West - Saskatoon, SK - S7K 3X5



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Date: 01/18/2011 Scale: 1:500,000
4.2-2_ELC_in_RSA_Access_Road_LSAs.mxd
Data Sources: Natural Resources Canada, GeoBase®, National Topographic Database, AREVA Resources Canada Inc., and Gebauer & Associates.

FIGURE 4.2-2
ECOLOGICAL LAND CLASSIFICATION UNITS IN THE REGIONAL STUDY AREA AND ACCESS ROAD LOCAL STUDY AREAS

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Gebauer & Associates
ENVIRONMENTAL CONSULTANTS
CASLYS CONSULTING
AREVA

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Figure 4.2-3A Percentage of Ecological Land Classification Units in Mine Local Study Area

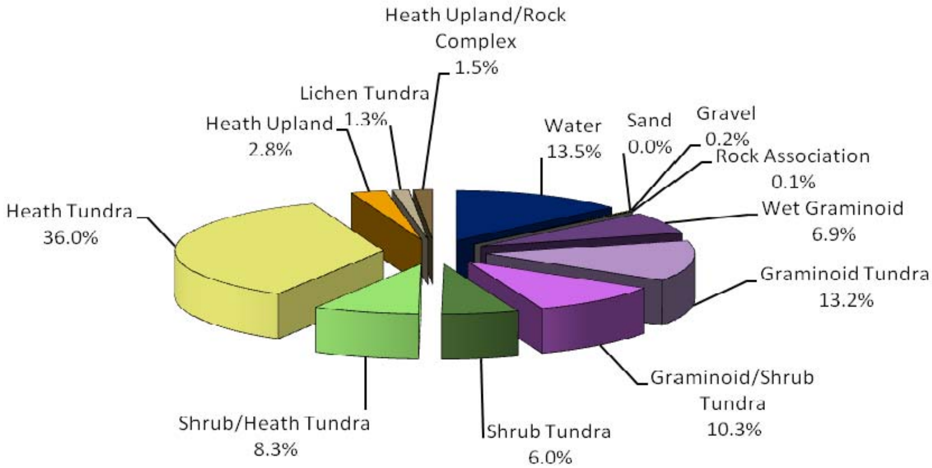


Figure 4.2-3B Percentage of Ecological Land Classification Units in Regional Study Area

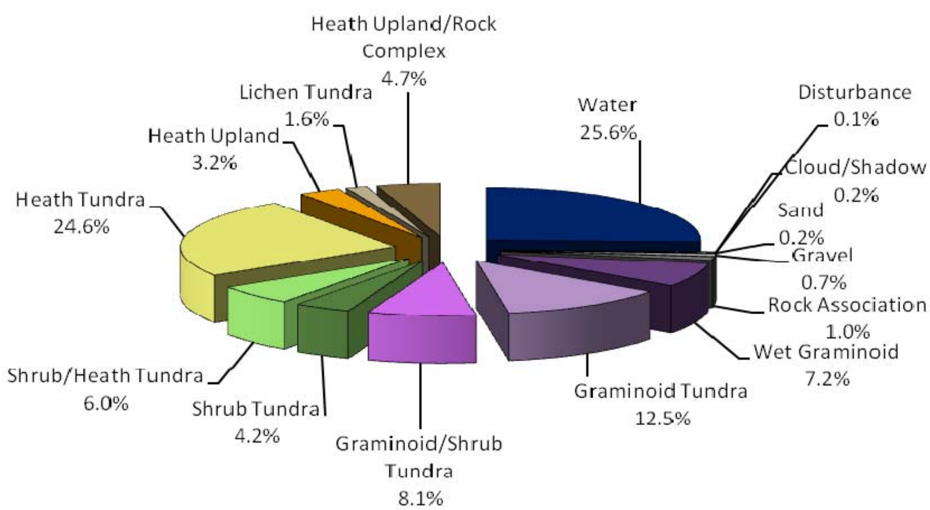


Figure 4.2-4A Percentage of Ecological Land Classification Units along North All-Weather Access Road Local Study Area

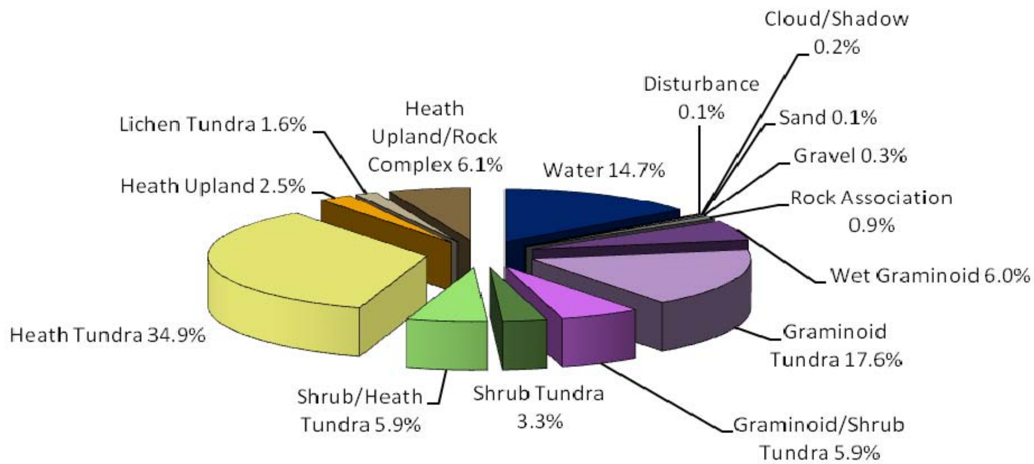


Figure 4.2-4B Percentage of Ecological Land Classification Units along South All-Weather Access Road Local Study Area

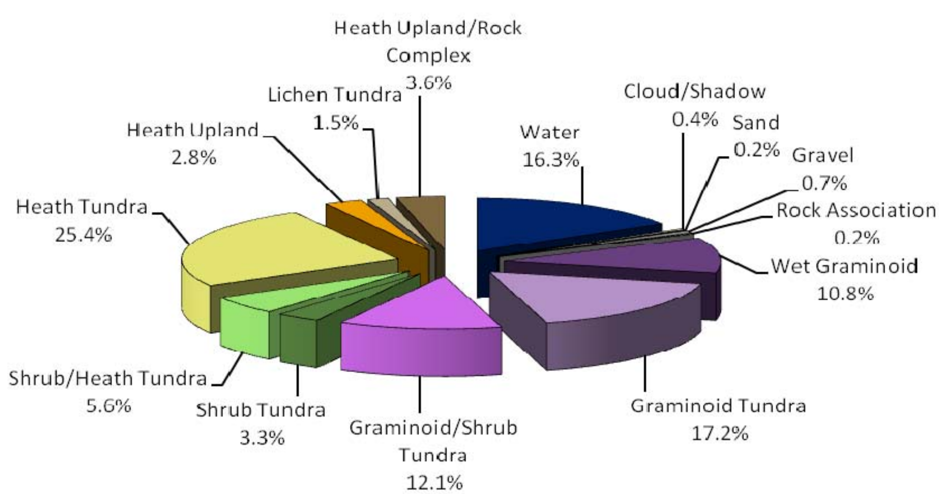


Figure 4.2-4C Percentage of Ecological Land Classification Units along Winter Access Road (South) Local Study Area

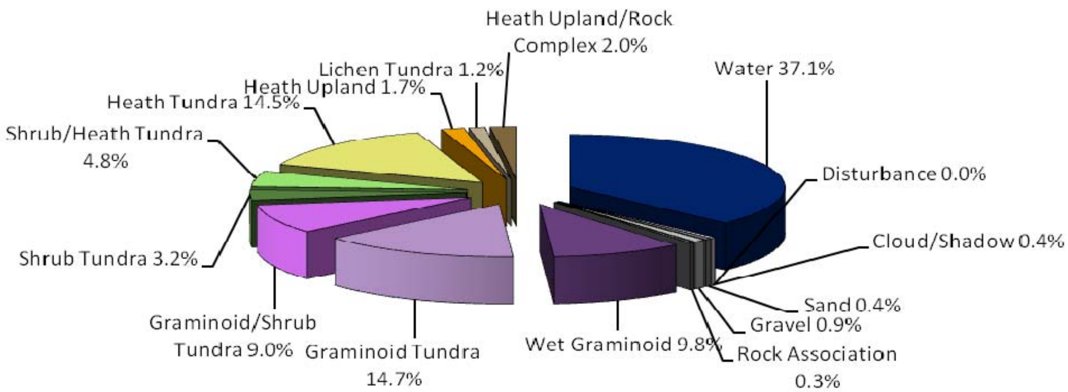
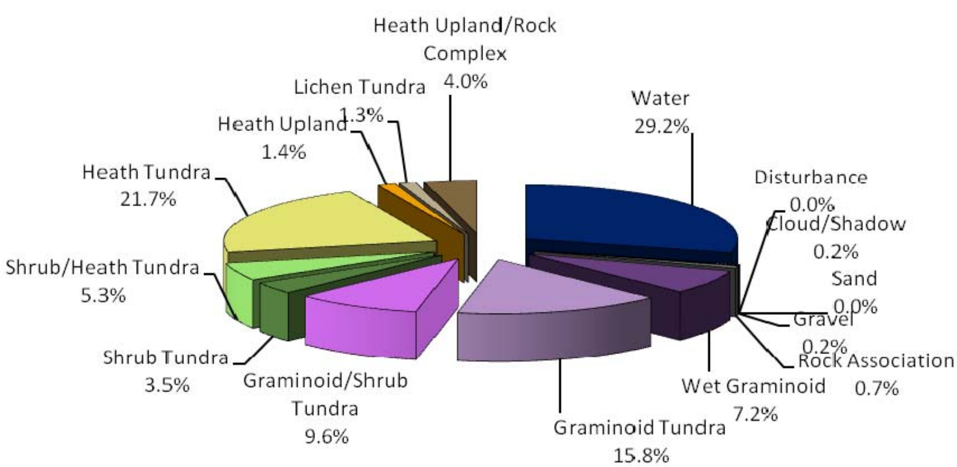
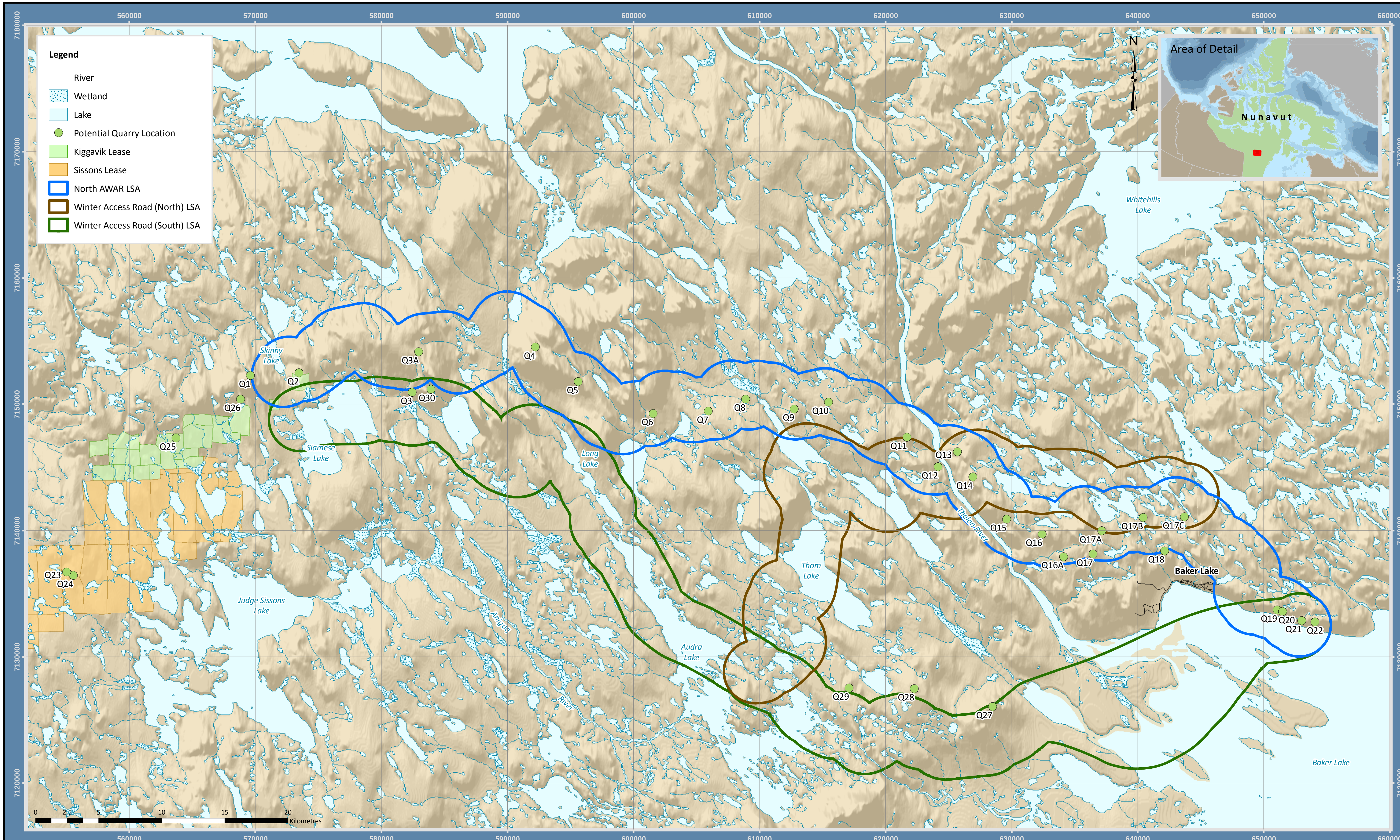


Figure 4.2-4D Percentage of Ecological Land Classification Units along Winter Access Road (North) Local Study Area





Projection: NAD 1983 UTM Zone 14N
Creator: CASLYS CONSULTING LTD.
Date: 01/18/2011 Scale: 1:275,000
File: 4.2-5_Potential_Quarries_AWAR.mxd
Data Sources: Natural Resources Canada, GeoBase®, National Topographic Database, AREVA Resources Canada Inc., and Gebauer & Associates.

FIGURE 4.2-5
POTENTIAL QUARRY LOCATIONS ALONG THE NORTH ALL-WEATHER ACCESS ROAD AND THE NORTH AND SOUTH WINTER ACCESS ROADS

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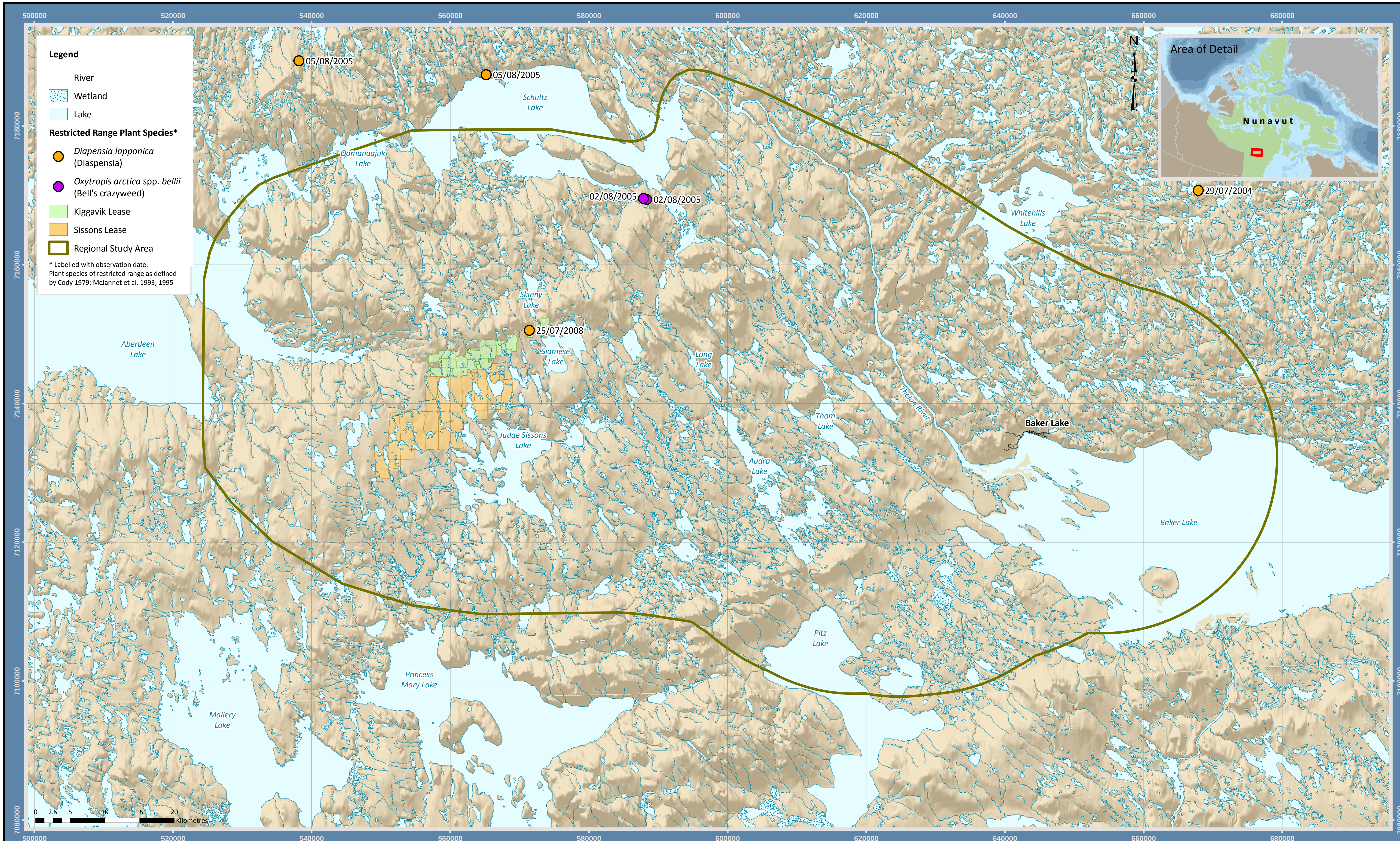

Projection: NAD 1983 UTM Zone 14N
Creator: CASLYS CONSULTING LTD.
Date: 1/27/2011 Scale: 1:500,000
File: 4.2-6_Restricted_Range_Plant_Species_RSA.mxd
Data Sources: Natural Resources Canada, GeoBase®, National Topographic Database, AREVA Resources Canada Inc., and Gebauer & Associates.

FIGURE 4.2-6
RESTRICTED RANGE PLANT SPECIES IN THE KIGGAVIK REGIONAL STUDY AREA

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5 SOILS

5.1 METHODS

5.1.1 Literature Review

Historical studies in the area around the Kiggavik Project, largely investigations initiated by Urangesellschaft, were used to review the state of knowledge for the Project area and were integrated as much as possible in the characterization of baseline soil conditions for the Mine Local Study Area (LSA), road LSAs and Regional Study Area (RSA). Wherever possible, comparable historical data were used to describe baseline conditions. Differences in study area, design and methodologies, as well as incompleteness of some datasets, prevented direct comparisons with baseline data collected from 2007 to 2010. At a minimum, the availability of historical data is discussed prior to presentation of baseline data, to provide additional context. A summary table of historical studies related to vegetation resources is provided in Table 5.1-1 (including current baseline studies).

The recent development and proximity of the Agnico-Eagle Mine (AEM) Meadowbank Project located east of the Kiggavik Project and north of Baker Lake makes it a useful source of regional data. Terrestrial baseline studies were completed at Meadowbank from 1999 to 2005 and long-term monitoring studies have been completed from 2006 to 2010. Wherever possible, this information was used to provide additional regional context (AEM 2009, 2010; Cumberland 2005). Other available literature relevant to soils included several small scale (1:100,000 to 1:1,000,000) maps of surficial geology, soils, and topography (AAFC 1996; ESWG 1995, internet site; Natural Resources Canada NTS Sheets 55M, 56D, 65P, 66A and 66B).

Table 5.1-1 Summary List of Available Baseline Data on Soil Conditions

Year (reference)	Reconnaissance	Land Classification	Soil (descriptive only)	Soil Survey	Soil Chemistry
1985 (Svobada et al. 1985)	-	-	-	-	Mine LSA RSA
1986 (Beak 1987a)	-	LSA RSA	LSA RSA	-	-
1987 (Beak 1987b)	-	LSA	LSA	-	LSA
1989 (Wickware 1990)	LSA (BL) RSA (old road)	Mine LSA RSA (old road)	Mine LSA	-	-
1990 (Geomatics 1990)	Sissons LSA	-	-	-	-
1991 (Geomatics 1991)	-	-	-	Mine LSA	-
2007	-	Mine LSA RSA	-	-	LSA
2008	LSAs	LSAs RSA	-	-	LSA
2009	LSAs	LSAs RSA	-	LSAs RSA	RSA

'-' = type of survey was not included
BL = Baker Lake dock facility; LSAs = refers to North and South AWAR, and/or Winter Access Road (North or South) LSAs (note that RSA/LSA pre-2007 boundaries are different than presented herein)

5.1.2 Field Surveys

5.1.2.1 Soil Survey

During the 2009 field season, soil survey plots were completed as part of the Ecological Land Classification (ELC) field surveys described in Section 4.1.2 (see Figure 4.1-1 for 2009 plot locations). Soil pits were excavated to approximately 50 cm or less where bedrock or permafrost was encountered. Soils were described according to the Canadian System of Soil Classification (CSSC 1998). General site characteristics were assessed in 20 by 20 m plots following the methodology established in the Field Manual for Describing Terrestrial Ecosystems (BC MELP and MoF 1998). At each location several attributes were recorded to describe the soil horizon layer, including:

- depth;
- grade (weak, moderate, strong);
- class size;
- kind (i.e., sub-angular blocky, angular-blocky, granular);
- consistency;

- colour;
- coarse fragment;
- mottles;
- roots; and
- texture.

Where field survey data were not available, potential soil subgroups were extrapolated from the terrain, surficial material, and vegetation characteristics for the identified ELC units

5.1.2.2 Soil Chemistry Sampling

The sampling strategy called for the collection of soil samples from 12 sampling locations around the RSA and Mine LSA for chemical analysis (Figure 5.1-1).

In 2007, six 'near-field' locations were identified as permanent sample plots in the Mine LSA and soil samples were collected from each location (KIG1, KIG2 and KIG3, and SIS1, SIS2 and SIS3; see Figure 5.1-1). Based on analysis of preliminary data, recommendations were made to increase the number of sampling locations both inside and outside the Mine LSA to obtain better representation of pre-Project conditions. Consequently, four additional near-field locations were identified in the Mine LSA (KIG4 and KIG5, and SIS4 and SIS5; see Figure 5.1-1). Soil samples were collected at all 10 of these sampling locations in 2008. In 2009, two 'far-field' locations were identified in the RSA in areas outside of the potential influence of mine facilities, as indicated by air dispersion models. In addition to documenting baseline conditions on terrestrial conditions within both the Mine LSA and the RSA, ongoing monitoring of soil chemistry from near-field and far-field sampling locations will help evaluate any observed changes as Project activities proceed. Plant tissue (see Section 4 above), and insect and small mammal/bird tissues were also collected at the same locations.

At each of the sampling locations, five sample sites were selected within a 200 to 300 m radius, with a minimum distance of 150 m between sample sites. Coordinates of sampling sites at each of the 12 sampling locations are provided in Attachment A.

Within each sample site, representative grab samples were collected from five separate test pits per sample site and were composited. Samples were collected from depths of approximately two to four centimeters below ground level, although collection depths varied as surface organic and permafrost depths were not static. Samples targeted the 'A', 'B' and 'C' soil layers between the surface organic layer and permafrost layer. Standard sampling procedures were followed for quality assurance/quality control (QA/QC). Samples were collected using stainless steel trowels and garden shovels. All equipment was sterilized after each use with Liqui-Nox (mixed according to bottle instructions) dispensed from a squeeze bottle. Field staff wore latex gloves. Samples were placed in new Zip-Loc bags, stored in a cooler, and shipped on ice directly to the laboratory.

In 2007, peat and mineral soil were collected and analyzed separately but differences in chemistry were minimal; therefore, only mineral soil samples were collected in 2008 and 2009.

5.1.3 Laboratory Analysis

5.1.3.1 Soil Analysis

Soil samples were sent to Saskatchewan Research Council (SRC) Analytical Laboratories (Saskatoon, SK) and analyzed for pH, total metals, and radionuclides. For the Mine LSA, all 61 discrete samples collected in 2007 and 2008 were analyzed for metals. All 10 discrete samples from the RSA (five from each sampling location) were analyzed for metals and radionuclides.

Samples collected from the Mine LSA for radionuclide analysis included a combination of discrete and composite samples based on quantities collected, but together provided appropriate representation of the near field and far field sampling areas. In 2007, 11 samples (separated for peat and mineral soil) were analyzed for radionuclides (one sample of mineral soil collected at each of the six sampling locations, and one sample of peat collected at all locations except SIS3). In 2008, 20 discrete samples (two from each sampling location) and 11 composite samples were analyzed for radionuclides. These composite samples included one composite from each sampling location, plus an extra sample from KIG4.

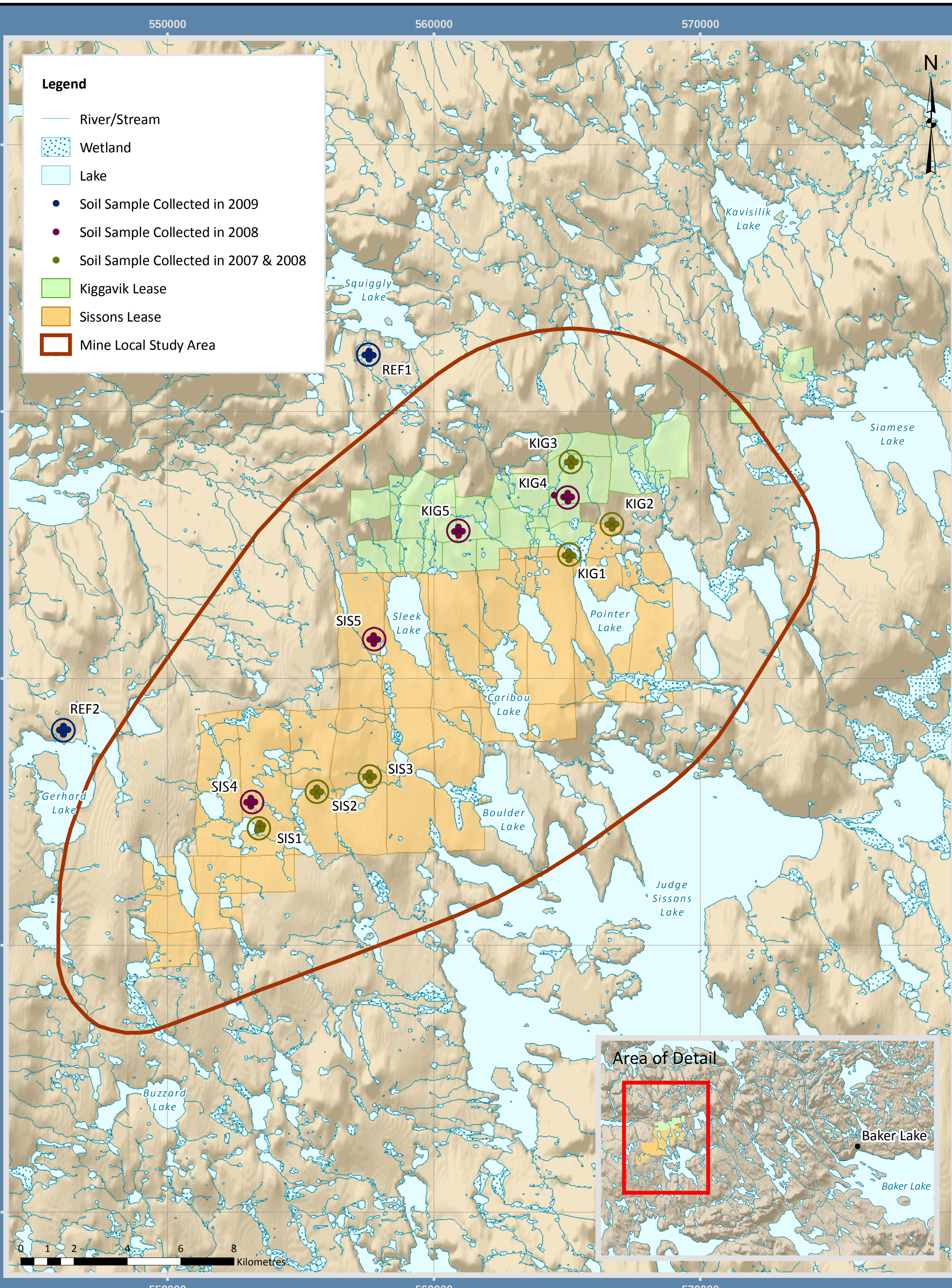
Details on analytical methods are provided in Attachment B. Parameters analyzed included:

- Elemental analysis by ICP Atomic Emission Spectroscopy (ICP-AES) and Inductively Coupled Plasma Mass Spectrometry (ICP-MS);
- Radium-226, Thorium isotopes and Polonium-210 by Alpha Spectroscopy; and
- Lead-210 by Beta Counting of the Bismuth-210 Successor Product

5.1.4 Data Analysis

5.1.4.1 Chemistry Data

Basic statistics (i.e., mean, standard deviation, minimum and maximum) were used to analyze chemistry data from the available baseline database. Data were summarized separately for the Mine LSA and RSA sampling locations. Statistical calculations used a value equivalent to half of the detection limit value for results below detection limit, considered to be a conservative estimate. Using these summary statistics, comparisons could be made between different areas, such as stations within the Mine LSA and RSA, and different years (i.e., more recent data from 2007 to 2009 compared to historical data, where available).



Projection: NAD 1983 UTM Zone 14N
Creator: CASLYS CONSULTING LTD.
Date: 01/26/2011 Scale: 1:200,000
File: 5.1-1_Soil_Sample_Locations.mxd
Data Sources: Natural Resources Canada, GeoBase®, National Topographic Database, AREVA Resources Canada Inc., and Gebauer & Associates.

FIGURE 5.1-1
SOIL SAMPLING LOCATIONS

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5.2 RESULTS

5.2.1 Soil Classification

Soils in the region around the Kiggavik Project were originally described by BEAK (1987a, 1987b), Wickware (1990) and Geomatics (1991). In general, the soil profile in the Kiggavik RSA consists of a shallow organic soil layer underlain by glacial tills varying in thickness from less than one metre on ridges to more than four metres in depressions (AREVA 2008). Soil deposits or profiles identified within the Project LSAs and anticipated footprints do not appear to be consistent with what would be expected in similar areas in the RSA and surrounding Arctic environments.

The soils documented for the Kiggavik RSA included Turbic Cryosols, Static Cryosols and Organic Cryosols. Cryosols are formed in either mineral or organic materials that have permafrost either within one metre of the surface or within two metres if the active layer of the soil profile has been strongly cryoturbated (CSSC 1998). The active layer of Cryosolic soils is frequently saturated with water, especially near the frozen layers or permafrost table.

Specific soil classes documented in the Kiggavik RSA during the current baseline program are listed in Table 5.2-1. A general description of these soils and their classes is provided below. Also listed in the table are the soil classes documented for the study area prior to initiation of the 2008 ELC field surveys. One Regosol was documented historically (Wickware 1990). Regosols are an order of soils not affected by permafrost within one metre of the surface. The location of the Regosol soil type was not noted in available information, and this soil type was not noted in the recent field surveys. Detailed information for each of the soil classes listed is provided in sections 5.2.1.1 to 5.2.1.3. The information provided is derived from The Canadian System of Soil Classification (1998).

Table 5.2-1 Soil Classes in the Kiggavik Regional Study Area

Soil Order	Soil Class	Abbreviation	Previously Documented[a]
Static Cryosols	Orthic Static Cryosol	O.SC	√
	Brunisolic Static Cryosol	BR.SC	√
	Gleysolic Static Cryosol	GL.SC	√
	Histic Static Cryosol	H.SC	X
	Regosolic Static Cryosol	R.SC	X
	Histic Regosolic Static Cryosol	HR.SC	X
Turbic Cryosols	Orthic Turbic Cryosol	O.TC	√
	Brunisolic Turbic Cryosol	BR.TC	√
	Gleysolic Turbic Cryosol	GL.TC	√
	Regosolic Turbic Cryosol	R.TC	X
Organic Cryosols	Terric Fibric Organic Cryosols	TFI.OC	X
	Terric Humic Organic Cryosols	THU.OC	√
Orthic Regosols	(Not found)		(Class not specified)

[a] from Wickware 1990

5.2.1.1 Turbic Cryosols

Mineral soils with marked cryoturbation are classified as Turbic Cryosols, which are often found in conjunction with permafrost features such as patterned ground. To be classified as a Turbic Cryosol, the permafrost layer must be found within two metres of the mineral surface. The LSA and RSA contain dominantly Brunisolic Turbic Cryosols and Orthic Turbic Cryosols (AAFC 1996). Turbic Cryosols can be found in any area where the mean annual soil temperature is less than or equal to zero degrees Celsius; however, they are most commonly found in fine-textured mineral parent materials such as glacial till and glaciolacustrine.

Orthic Turbic Cryosol (O.TC): Soils are classified as Orthic Turbic Cryosols (O.TC) if their B horizon is less than 10 cm thick and is frozen (Bmy), and the profile is strongly cryoturbated. Permafrost must be encountered within two metres of the surface, and there may be gleying in the horizon immediately above the permafrost. The surface material may be organic in nature, but must be less than 15 cm thick.

Brunisolic Turbic Cryosol (BR.TC): Soils are classified as Brunisolic Turbic Cryosols (BR.TC) if they contain an unfrozen B horizon (Bm) at least 10 cm thick. This B horizon must be continuous over the imperfectly- to well-drained part of the pedon, and must be relatively unaffected by cryoturbation. All other horizons (other than the B horizon described above) should be strongly cryoturbated. The surface material may be organic in nature, but must be less than 15 cm thick.

Gleysolic Turbic Cryosol (GL.TC): GL.TC soils develop in poorly drained areas under reducing conditions. Either the B or C horizon must be both gleyed and strongly cryoturbated, and show evidence of gleying or mottling to the mineral surface. The surface material may be organic in nature, but must be less than 40 cm thick. GL.TC soils are most commonly found in lower landscape positions where surface water collects, or in areas of localized groundwater discharge.

Regosolic Turbic Cryosol (R.TC): R.TC soils are characterized by the absence of a B horizon but with evidence of cryoturbation. These soils are poorly developed and usually have little incorporated organic matter. R.TC soils are commonly found in higher landscape positions such as slope crests where surface water dominantly runs laterally across the ground surface instead of vertically through the profile.

5.2.1.2 Static Cryosols

Static Cryosols have permafrost within one metre of the surface, but show little or no evidence of cryoturbation. They generally develop on coarse-textured mineral parent material or thin soils over bedrock or in a wide textural range of recently deposited or disturbed sediments where evidence of cryoturbation is still largely absent. Static Cryosols may contain surface organic horizons less than 40 cm thick. These soils can be found in any areas where the mean annual soil temperature is less than or equal to zero degrees Celsius; however they are most commonly found in coarse textured mineral parent materials such as glaciofluvial, fluvial, aeolian, and some glacial till materials.

Orthic Static Cryosol (O.SC): Soils are classified as O.SC if they contain a B horizon less than 10 cm thick. The surface material may be organic in nature, but must be less than 15 cm thick.

Brunisolic Static Cryosol (BR.SC): Soils are classified as BR.SC if they contain an unfrozen B horizon (Bm) at least 10 cm thick. The surface material may be organic in nature, but must be less than 15 cm thick.

Gleysolic Static Cryosol (GL.SC): GL.SC soils develop in poorly drained areas under reducing conditions and contain a B horizon or C horizon (or both) that is gleyed. Soils show evidence of gleying or mottling to the mineral surface. The surface material may be organic in nature, but must be less than 40 cm thick. GL.SC soils are generally located in low landscape positions where surface water can accumulate and cause saturated, reducing conditions or where groundwater discharges to the surface (or near surface).

Histic Static Cryosol (H.SC): Soils are classified as H.SC if they contain a thick organic (peaty) horizon 15 to 40 cm thick in the upper one metre of the soil profile. Soils where the combined thickness of surface and subsurface organic layers exceeds 15 cm are also considered Histic Static Cryosols. H.Sc soils must contain a B horizon that is continuous across the pedon. These soils are most commonly found in lower landscape positions that are conducive to the accumulation of organic matter.

Regosolic Static Cryosol (R.SC): R.SC soils are characterized by the absence of a B horizon. These soils are poorly developed, and usually occur on recently deposited material and may contain a thin peaty organic surface horizon less than 15 cm thick. R.SC soils are most commonly found in higher landscape positions such as slope crests where surface water dominantly runs laterally across the ground surface instead of vertically through the profile.

Histic Regosolic Static Cryosol (HR.SC): HR.SC soils are characterized by a thick (15 to 40 cm) organic surface horizon and the absence of a B horizon, and are most commonly found in lower landscape positions that are conducive to the accumulation of organic matter.

5.2.1.3 Organic Cryosols

Organic Cryosols have permafrost within one metre of the surface and contain an organic layer greater than 40 cm thick. They develop principally from organic materials and have a surface layer composed of at least 30% organic material.

Terric Fibric Organic Cryosols (TFI.OC): TFI.OC soils are composed dominantly of fibric material and have a mineral contact within one metre of the surface.

Terric Humic Organic Cryosols (THU.OC): THU.OC soils are composed dominantly of humic material and have a mineral contact within one metre of the surface.

5.2.2 Soils Description of Ecological Land Classification Units

The general terrain and soils characteristics for each ELC unit identified in the Kiggavik RSA are described below, and are summarized in Table 5.2-2. Detailed soil information for each survey plot is provided in Attachment G.

Wet Graminoid Community: The Wet Graminoid ELC unit occurs in depressions, drainage basins and along lakeshores, and is associated with nearly level topography (0-2% slope) and poor drainage. Rock content at the surface is low, and organic material generally covers 85% of the surface, with the remainder composed of water. A peat layer is often found at the surface with a thickness of 15 to 20 cm, underlain by sandy loam or gravelly material. The Wet Graminoid sites generally have a high nutrient and moisture regime due to the movement of nutrient-rich groundwater through the substrate. Soils are frequently saturated and may contain standing water. Soil types associated with sedge communities are potentially Gleysolic Static Cryosols, due to long periods of the year in which the soil is saturated, and to the absence of cryoturbation. In areas where the period of soil saturation is less, Histic Static Cryosols or Histic Regosolic Static Cryosols may develop.

Graminoid Tundra Community: The Graminoid Tundra ELC unit is closely associated with the Wet Graminoid community, occurring on gently sloping or relatively flat topography (0-2% slope) with poor drainage. Rock content at the surface is low and a peat layer is frequently at the surface with a thickness of 15 to 20 cm, underlain by sandy loam or gravelly material. Graminoid Tundra sites generally have a high nutrient and moisture regime due to the movement of nutrient-rich groundwater through the substrate. Soil types associated with Graminoid Tundra communities are potentially Gleysolic Static Cryosols, Gleysolic Turbic Cryosols, Brunisolic Static Cryosols, Brunisolic Turbic Cryosols, Terric Fibric Organic Cryosols and Terric Humic Organic Cryosols.

Graminoid/Shrub Tundra Community: The Graminoid/Shrub Tundra ELC unit is a transitional class between Graminoid Tundra and Shrub Tundra.

Shrub Tundra Community: The Shrub Tundra ELC unit generally occurs at the toe of a gentle slope (0-6%) at the outflow of groundwater from the active layer, and may also be present at the edge of sedge communities where the moisture regime is transitional between the saturated conditions of the sedge community and the moderately well-drained conditions of the Heath Tundra. The moisture regime is generally medium to high, and the nutrient regime is medium. Coverage of organic material at the surface is high (approximately 80%) and rocks are common with approximately 20% coverage. Soil is generally thin and consists of a thin layer of humus over sandy loam-textured material, followed by gravel. Cryoturbation may be present in these areas, resulting in soils such as Orthic Turbic Cryosols, Orthic Static Cryosols, Brunisolic Turbic Cryosols, or Brunisolic Static Cryosols. Poorly drained soils such as Gleysolic Static Cryosol or Gleysolic Turbic Cryosol may also occur.

The riparian shrub component of the Shrub Tundra ELC unit is associated with drainage areas between lakes and transitory ponds where drainage areas frequently have a boulder substrate through which water flows. Shrub Tundra sites have a medium to high moisture regime and a medium nutrient regime. Slopes are gentle (0-2%). Soil is generally thin or non-existent, and may consist of just an accumulation of organic material or litter perched on boulders. Most of the fine particles necessary for soil development have been removed through fluvial action. Soils may be classified as Regosolic Static Cryosols or Regosolic Turbic Cryosols.

Table 5.2-2 Description of Terrain and Soils Characteristics of Ecological Land Classification Units

ELC Units	Terrain Type	Terrain Characteristics	Soil Classes[(a)]
Water	N/A		
Disturbance	Variable and site-specific soil and terrain characteristics		
Cloud/Shadow	N/A		
Sand	No specific soil and terrain characteristics		
Gravel	No specific soil and terrain characteristics		
Rock Association	No specific soil and terrain characteristics		
Wet Graminoid	Shallow organic over lacustrine, fluvial, or morainal materials	Depressions, drainage basins, shorelines. Poorly drained, saturated soils with peaty surface layer. High moisture and nutrient regime.	BR.TC, GL.SC, HR.SC
Graminoid Tundra	Morainal	Gently sloping lowland areas. Medium to high moisture regime and medium nutrient regime. Poorly drained soils with peaty surface layer.	BR.SC, BR.TC, GL.SC, GL.TC, TFI.OC, THU.OC
Graminoid/Shrub Tundra	Transitional unit between Graminoid Tundra community and Shrub Tundra community.		
Shrub Tundra	Morainal, Fluvial	Flat to gentle slopes with peaty surface layer. Medium to high moisture regime, and medium nutrient regime	BR.SC, BR.TC, GL.SC, GL.TC, R.SC, R.TC
Shrub/Heath Tundra	Transitional unit between Shrub Tundra community and Heath Tundra community.		
Heath Tundra	Morainal	Flat to gentle slopes with low to medium moisture and nutrient regimes. May have a thin peaty surface layer.	BR.SC, BR.TC, GL.SC, H.SC, O.TC, R.SC
Heath Upland	Bedrock, boulder field, morainal	Flat to gently sloping upland areas. Low to medium moisture and nutrient regimes. Typically contains glacial till, gravel and boulder substrate and thin soils.	BR.SC, BR.TC, R.SC, O.TC
Lichen Tundra	Bedrock, boulder fields, gravel, cobble	Flat to gently sloping upland areas. Poorly developed soils with low moisture and nutrient regime.	R.SC
Heath Upland/Rock Complex	Transitional unit between Heath Upland community and Rock Complex community.		

[(a)] Refer to Section 5.2.1 for a description of soil classes

N/A = Not applicable (no soil present)

Shrub/Heath Tundra Community: The Shrub/Heath Tundra ELC unit is a transitional class between Shrub Tundra and Heath Tundra.

Heath Tundra Community: The Heath Tundra ELC unit is the most abundant unit in the RSA area, occurring on flat to gently sloping (0-10%) terrain that has a low to medium nutrient and moisture regime. The majority of terrain within this unit is covered by an organic surface layer scattered with surface stones. Cryoturbation is common and results in the formation of Orthic Turbic Cryosols and Brunisolic Turbic Cryosols. Regosolic Static Cryosols and Histic Static Cryosols can also be found in this community. Parent material is predominantly morainal and demonstrates sandy loam surface textures over material with increasing coarse fragment content.

Heath Upland Community: The Heath Upland ELC unit occurs on gently sloping (0-10%) upland areas with a low to medium nutrient and moisture regime. Typically a thin layer of soil covers glacial till, gravel and boulders. Cryoturbation is common and results in the formation of Orthic Turbic Cryosols and Brunisolic Turbic Cryosols. Regosolic Static Cryosols and Histic Static Cryosols can also be found in this community. Parent material includes bedrock, boulder and morainal features.

Lichen Tundra: The Lichen Tundra ELC unit occurs on flat to gently sloping upland areas and esker tops with a low moisture and nutrient regime. A continuous mat of lichen covers the rocky substrate (i.e., bedrock, boulders and gravel) and any thin soils that are present will be poorly developed and likely classified as Regosolic Static Cryosols.

Heath Upland/Rock Complex Community: The Heath Upland/Rock Complex ELC unit is a transitional class between Heath Upland and Rock complexes.

Gravel/Sand/Rock: No specific soil and terrain characteristics are associated with the Gravel or Sand ELC units.

Disturbed Sites: Disturbed sites may occur on any substrate. No specific soil and terrain characteristics are associated with this ELC unit.

5.2.3 Soil Chemistry

Chemistry data for soil samples collected from 2007 to 2009 are summarized in Table 5.2-3. Summary data include the range of concentrations, mean and standard deviation measured in soil samples from the Mine LSA (2007 and 2008) and the reference stations in the RSA (2009). Although separate mineral soil and peat samples were both collected in 2007, all individual samples are included in Table 5.2-3 regardless of soil type. In general, differences between mineral soil and peat were minimal. Raw soil chemistry data are provided in Attachment H.

Concentrations of metals are compared to Canadian Soil Quality Guideline levels for industrial land use areas in Table 5.2-3 (CCME 2006). One sample (location KIG5; see Figure 5.1-1) exceeded arsenic guidelines. Two 2007 peat samples from the Mine LSA slightly exceeded guideline levels for copper (location KIG1, SIS2). One of the reference samples slightly exceeded nickel guidelines. Exceedances are likely due to natural conditions rather than human-induced disturbance.

Historical soil chemistry data was collected but not included in Table 5.2-3 since most of the data was not directly comparable to the current baseline dataset. Future assessments could use historical data to evaluate expected variability in background soil chemistry data. In 1985, samples were collected to measure natural levels of radionuclides in regional soils (Svobada et al. 1985). In this study, composite soil samples were collected along two perpendicular transects (running north-to-south and east-to-west) that intersected at the mine camp (as summarized by Wickware 1990). Data showed distinct anomalies in natural concentrations of radionuclides at two areas that correlated to ore body locations. Activities of uranium-238, radium-226, and bismuth-214 were three to four orders of magnitude greater in the vicinity of one ore body (the 'Main Showing') compared to the transect average. Near a second ore body (the 'Centre Zone'), which was lightly buried under glacial drift, radionuclide activities were about 100 times that of the transect average. Activities fell to very low levels about 200 m from the 'Main Showing'. Patterns of activity of cesium-137 did not resemble the uranium radionuclides pattern and were more variable.

Table 5.2-3 Summary Table of 2008/2009 Soil Chemistry Data for Mine Local Study Area and Regional Study Area, Compared to Canadian Soil Quality Guideline Levels

Parameter	Units	Mine LSA							RSA					CCME Guidelines (Industrial)
		Sample Number			Mean	SD	Range		Sample Number	Mean	SD	Range		
		2007[a]	2008[b]	Total			Min	Max	2009[c]			Min	Max	
pH	pH	6	50	56	6.1	0.76	4.8	7.8	ND	ND	ND	ND	ND	N/A
Moisture (mineral soil)	%	6	0	6	16	4.8	14	22	10	11	1.8	9.3	14.3	N/A
Moisture (peat)	%	5	0	5	78	3.6	74	84	ND	ND	ND	ND	ND	N/A
Aluminum	µg/g	11	0	11	17,227	11,318	4,400	37,200	10	7,594	3,960	3,500	16,200	N/A
Antimony	µg/g	11	50	61	4.1	2	<0.1	5.0	10	<0.2	N/A	<0.2	N/A	40
Arsenic	µg/g	11	50	61	3.7	2	1.2	13.6	10	3.1	1.4	1.4	5.8	12
Barium	µg/g	11	50	61	156	177	27	910	10	138	202	48	710	2,000
Beryllium	µg/g	11	50	61	0.38	0	<0.5	2.1	10	0.4	0.11	0.3	0.6	8
Boron	µg/g	11	0	11	16	20	<1	54	10	15	19	0.5	48	N/A
Cadmium	µg/g	11	50	61	0.26	0	<0.1	0.89	10	<0.1	N/A	<0.1	N/A	22
Chromium	µg/g	11	50	61	20	7	4.6	44	10	15	14	6.8	54	87
Cobalt	µg/g	11	50	61	4.3	2	1.3	8.9	10	4.0	3.3	1.6	13	300
Copper	µg/g	11	50	61	14	19	2.2	96	10	6.3	6.1	2	23	91
Iron	µg/g	11	0	11	12,391	5,218	5,700	25,000	10	11,810	4,896	7,400	25,100	N/A
Lead	µg/g	11	50	61	15	10	0.74	85	10	11	6.5	4.1	23	600
Manganese	µg/g	11	0	11	150	77	11	280	10	115	53	61	230	N/A
Mercury	µg/g	11	50	61	0.012	0	<0.005	0.12	0	ND	ND	ND	ND	50
Molybdenum	µg/g	11	50	61	2.0	1	0.2	6.9	10	0.2	0.067	0.1	0.3	40
Nickel	µg/g	11	50	61	13	6	<5	34	10	14	17	5.1	61	50
Selenium	µg/g	11	50	61	0.92	0	<0.1	<4.0	10	0.08	0.079	0.05	0.3	2.9
Silver	µg/g	11	50	61	0.84	0	<0.1	1.0	10	<0.1	N/A	<0.1	N/A	40
Strontium	µg/g	11	0	11	73	18	47	110	10	115	102	66	400	N/A

Parameter	Units	Mine LSA							RSA					CCME Guidelines (Industrial)
		Sample Number			Mean	SD	Range		Sample Number	Mean	SD	Range		
		2007[a]	2008[b]	Total			Min	Max	2009[c]			Min	Max	
Thallium	µg/g	11	50	61	0.44	0	<0.05	0.50	10	<0.2	N/A	<0.2	N/A	1
Tin	µg/g	11	50	61	2.1	1	<0.05	2.5	10	0.08	0.049	0.05	0.2	300
Titanium	µg/g	11	0	11	303	96	54	410	10	608	419	210	1,600	N/A
Uranium	µg/g	11	0	11	2.5	2	0.65	6.0	10	1.3	0.56	0.8	2.4	300
Vanadium	µg/g	11	50	61	19	7	4.3	47	10	22	13	13	59	130
Zinc	µg/g	11	50	61	19	8	6.2	50	10	20	13	9.1	56	360
Lead-210	Bq/g	11	31[b]	42[b]	0.020	0.024	<0.006	0.13	10	<0.04	N/A	<0.04	N/A	N/A
Polonium-210	Bq/g	11	31[b]	42[b]	0.036	0.070	0.004	0.47	10	0.022	0.010	0.005	0.03	N/A
Radium-226	Bq/g	11	31[b]	42[b]	0.039	0.030	<0.01	0.14	10	0.035	0.020	0.005	0.08	N/A
Thorium-230	Bq/g	11	31[b]	42[b]	0.037	0.024	0.017	0.13	10	0.020	0.012	0.01	0.04	N/A
Thorium-232	Bq/g	0	31[b]	31[b]	0.028	0.012	<0.02	0.06	10	0.032	0.014	0.01	0.05	N/A

Shaded value indicates guideline level is exceeded
(a) Includes mineral soil samples collected from all six sampling locations and peat samples collected from five of the sampling locations (not SIS3)
(b) Includes 20 individual samples (two from each sampling location) and 10 composite samples (one composite from each sampling location), plus an extra sample collected at KIG4)
(c) Includes 10 samples collected from two sampling locations in 2009
ND = No data
N/A = Not applicable
SD = Standard deviation
CCME = Canadian Council of Ministers of the Environment Soil Quality Guideline (CCME 2006)

6 SUMMARY

The area around the Kiggavik and Sissons leases has been the subject of exploration and study since the late 1970s by various parties. Following initial feasibility and baseline studies, review of existing information and the submission of a formal Project Proposal in 2008, AREVA initiated the procedural requirements towards completing the Draft Environmental Impact Statement (DEIS). Baseline soil and plant investigations that occurred between 2007 and 2010 are included in this report.

Lying predominantly within the Dubawnt Lake Plain/Upland Ecoregion, the Kiggavik Project area is located in a low arctic region characterized by minimal topography, predominantly shrub tundra habitat with low structural habitat heterogeneity, an extreme northern climate, and relatively few terrestrial vertebrates. The terrestrial environment in the Kiggavik area is used by caribou, muskox, large predators, small mammals and upland birds, while the extensive water and wetland features dotting the landscape provide habitat for various species of waterbirds.

Human activities have historically consisted of subsistence hunting and gathering, and local plants and wildlife continue to be used by people living in the region. The Hamlet of Baker Lake is the community in closest proximity to the Kiggavik Project. Previous studies, as well as TK/IQ studies completed as part of this baseline program, demonstrate the continued dependency that local people have on the terrestrial resources in the region.

During the current baseline program, field data were collected on terrain conditions, soil types, and plant species present in the immediate area around the proposed mine and road alignments (the Local Study Area or LSA) as well as in the surrounding lands (the Regional Study Area or RSA). Soil and plant tissues were also collected for analysis of metals and radionuclides. Historical data and information were integrated wherever possible in order to provide as complete a description as possible of the vegetation and soil resources for the local and regional area surrounding the Kiggavik Project.

The focus of the vegetation and soils component was to provide a comprehensive and representative snapshot of current terrestrial conditions, including existing soil and habitat types, and their characteristics. Soil types were identified within the mine LSA as well as for two reference locations within the RSA. For vegetation, an Ecological Land Classification (ELC) was created to identify the habitat types that occur within the LSA and RSA. Through map analysis and field surveys, nine vegetated habitats and five largely non-vegetated habitats (e.g., sand, gravel, etc.) were identified. These ELC units are the basis for the vegetation description, and also the assessment of habitat suitability for wildlife.

The vegetation and soils baseline data collected for the Kiggavik Project will provide important information on pre-Project conditions that will allow prediction and monitoring of potential changes to these resources. Change, or impacts, that can be evaluated with the information provided in this baseline include changes to the amount of habitat available, the type of habitat available, and the plant species found within each habitat type. The location of high quality habitat for different terrestrial animals can now be considered more accurately when planning and designing different aspects of the project. Change in the amount of chemicals found in soil and plant tissues can be monitored and used to determine if possible food chain impacts are observed. As well, the vegetation and soils baseline provides the starting point from which the potential impacts to wildlife can begin to be assessed.

The baseline data collected will also be incorporated in subsequent human health and ecological risk assessments for the proposed development project with the goal of identifying potential impacts and implementation of integrated risk management solutions to mitigate identified concerns.

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7.2 INTERNET SITES

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7.3 PERSONAL COMMUNICATIONS AND INTERVIEWS

BLE (Baker Lake Elders). 2009. Summary of IQ focus group completed by Mitchell Goodjohn, Susan Ross, and Hattie Mannik with seven Elders. March 5, 2009; in AREVA 2010x (Appendix x of DEIS)

CIYA (Chesterfield Inlet Young Adults). 2009. Summary of IQ focus group completed by Linda Havers and Mitchell Goodjohn with eight young adults. May 8, 2009.

8 GLOSSARY

All-Weather Access Road (AWAR): A permanent road that is used all year-round, unlike a winter road which is built of snow and ice and is used only seasonally.

Cryoturbation: Frost churning, the mixing of soil horizons from the surface to the bedrock due to freezing and thawing.

Ecological Land Classification (ELC): A land classification system based on terrain, soils and vegetation, in which areas of similar ecology are identified and mapped within a hierarchy of ecosystems where broad to specific levels of detail are presented on a series of maps.

Ericaceous: Plants of the family Ericaceae that require an acidic soil.

Gleyed: Soil that is waterlogged.

Graminoid: Grasses and grasslike plants.

Horizon: Specific layers within the soil that show different characteristics and physical conditions

Hummock: a small knoll or mound above the ground; irregular ground surface.

Hygric: Of or pertaining to moisture.

Local Study Area (LSA): The area immediately surrounding specific components of the Project, including the Mine site and access roads. LSAs include the footprint of the infrastructure itself as well as a pre-determined buffer. The LSA provides a boundary for various surveys.

Mesic: A moderate or well-balanced supply of moisture.

Pedon: A unit of measure that contains all soil horizons of a particular soil type.

Permafrost: Permanently frozen ground.

Regional Study Area (RSA): The area surrounding all Project-related infrastructure, including entire road alignments and associated infrastructure, as well as a large buffer area. The size of the buffer is selected to ensure any changes across a larger-scale area can be adequately monitoring, and to provide an appropriate comparison to the LSAs and the various habitat and species that may move in and out of these areas.

Tussock: Small hill of grassy or grass-like growth.

Xeric: Of, characterized by, or adapted to an extremely dry habitat

Attachment A Coordinates of Tissue Sampling Stations and Sites 2008/09

File: VSBR/Attachment A Tissue Waypoints

Attachment A Coordinates of Tissue Sampling Stations and Sites (2007-09)

STATION	NAME	UTM_ZONE	EASTING	NORTHING
KIG1	KIG1-Sample 1	14 W	565065	7144614
	KIG1-Sample 2	14 W	565063	7144764
	KIG1-Sample 3	14 W	564915	7144611
	KIG1-Sample 4	14 W	565221	7144617
	KIG1-Sample 5	14 W	565069	7144463
KIG2	KIG2-Sample 1	14 W	566678	7145781
	KIG2-Sample 2	14 W	566675	7145933
	KIG2-Sample 3	14 W	566527	7145777
	KIG2-Sample 4	14 W	566829	7145784
	KIG2-Sample 5	14 W	566683	7145633
KIG3	KIG3-Sample 1	14 W	565160	7148108
	KIG3-Sample 2	14 W	565156	7148262
	KIG3-Sample 3	14 W	565311	7148115
	KIG3-Sample 4	14 W	565009	7148108
	KIG3-Sample 5	14 W	565153	7147962
KIG4	KIG4-Sample 1	14 W	565020	7146802
	KIG4-Sample 2	14 W	565017	7146952
	KIG4-Sample 3	14 W	564869	7146798
	KIG4-Sample 4	14 W	565171	7146806
	KIG4-Sample 5	14 W	565024	7146648
KIG5	KIG5-Sample 1	14 W	560923	7145517
	KIG5-Sample 2	14 W	560921	7145669
	KIG5-Sample 3	14 W	560773	7145513
	KIG5-Sample 4	14 W	561074	7145521
	KIG5-Sample 5	14 W	560927	7145364
SIS1	SIS1-Sample 1	14 W	553411	7134452
	SIS1-Sample 2	14 W	553458	7134590
	SIS1-Sample 3	14 W	553578	7134497
	SIS1-Sample 4	14 W	553537	7134351
	SIS1-Sample 5	14 W	553384	7134317
SIS2	SIS2-Sample 1	14 W	555609	7135754
	SIS2-Sample 2	14 W	555606	7135903
	SIS2-Sample 3	14 W	555461	7135754
	SIS2-Sample 4	14 W	555760	7135758
	SIS2-Sample 5	14 W	555612	7135605
SIS3	SIS3-Sample 1	14 W	557590	7136329
	SIS3-Sample 2	14 W	557587	7136478
	SIS3-Sample 3	14 W	557440	7136327
	SIS3-Sample 4	14 W	557741	7136331
	SIS3-Sample 5	14 W	557594	7136178
SIS4	SIS4-Sample 1	14 W	553133	7135373
	SIS4-Sample 2	14 W	553130	7135523
	SIS4-Sample 3	14 W	552983	7135369
	SIS4-Sample 4	14 W	553285	7135374
	SIS4-Sample 5	14 W	553136	7135222
SIS5	SIS5-Sample 1	14 W	557745	7141467
	SIS5-Sample 2	14 W	557897	7141468
	SIS5-Sample 3	14 W	557742	7141618
	SIS5-Sample 4	14 W	557593	7141463
	SIS5-Sample 5	14 W	557746	7141313
REF2	REF2-Sample 1	14 W	546101	7138078
	REF2-Sample 2	14 W	546099	7138221
	REF2-Sample 3	14 W	545947	7138070
	REF2-Sample 4	14 W	546259	7138086
	REF2-Sample 5	14 W	546093	7137914
REF1	REF1-Sample 1	14 W	557570	7152123
	REF1-Sample 2	14 W	557567	7152273
	REF1-Sample 3	14 W	557416	7152125
	REF1-Sample 4	14 W	557719	7152114
	REF1-Sample 5	14 W	557565	7151972

UTM Zone 14N, NAD83 (accuracy depends on GPS unit used for survey)

Attachment B Analytical Methods

File: VSBR/Attachment B ICP-AES

File: VSBR/Attachment B ICP-MS

File: VSBR/Attachment B Lead210

File: VSBR/Attachment B Po210

File: VSBR/Attachment B Radium

File: VSBR/Attachment B Thorium

SRC Analytical Laboratories

Standard Operating Procedure Summary

Elemental Analysis by ICP-AES (Simultaneous)

SOP Number: Chm-512

Summary:

Several elements in aqueous solution may be quickly and easily determined using Inductively Coupled Plasma Atomic Emission Spectroscopy (ICP-AES). The plasma is a stream of Argon gas that is ionized by an applied radio frequency field. Sample aerosols are injected into the plasma which subjects the atoms to temperatures of 6000 to 10,000K. The high temperatures atomize the sample. The atoms produce emission spectra which are optically measured in a computer controlled spectrometer.

Samples undergo suitable preparation to ensure that the analytes are in an aqueous environment. Water samples can be analyzed for dissolved metals directly without any preparation. Water samples are often digested with nitric and perchloric acids. The digestion ensures that analytes present in any suspended solids are in solution. A variety of sample types can be analyzed after suitable preparation.

Scope and Detection Limit:

Contact the laboratory for a complete list of current detection limits.

Sample Requirements

Water samples must be preserved with Nitric Acid.

Quality Control:

One of every 10 samples is analyzed in duplicate. At least one control sample is analyzed with each batch. Standards are analyzed after every 5 samples to check the calibration. Instrument performance checks are performed regularly. All quality control checks must be within specified limits or corrective action is taken.

References:

Standard Methods for the Examination of Water and Wastewater, 21st Ed., 2005. Part 3120, APHA-AWWA-WEF.

Compiled November 6, 2009 GS.

SRC Analytical Laboratories

Standard Operating Procedure Summary

Elemental Analysis by Inductively Coupled Plasma Mass Spectrometry (ICP-MS)

SOP Number: Chm-515

Summary:

Several elements in aqueous solution may be quickly and easily determined using Inductively Coupled Plasma Atomic Mass Spectrometry (ICP-MS). The plasma is a stream of Argon gas that is ionized by an applied radio frequency field. Sample aerosols are injected into the plasma which subjects the atoms to temperatures of 6000 to 10,000°K. The plasma dissociates the sample into its constituent atoms or ions. The ions are extracted from the central channel of the plasma and pass into the mass spectrometer, where they are separated on the basis of their mass to charge ratio by a quadrapole analyzer. The ions passing through the mass spectrometer are counted by an electron multiplier detector in a computer based data handling system.
A variety of sample types can be analyzed after suitable preparation.

Scope and Detection Limit:

Contact the laboratory for a complete list of current detection limits.

Sample Requirements

Samples should be collected in plastic containers and preserved with nitric acid. A minimum of 100 mL of water sample or 10 g of solid sample is required.

Quality Control:

One of every 10 samples is analyzed in duplicate. At least one control sample is analyzed with each batch. Standards and blanks are analyzed after every 10 samples to check the calibration. An internal standard is added to each sample. All quality control checks must be within specified limits or corrective action is taken.

References:

Standard Methods for the Examination of Water and Wastewater, 21st Edition, 2005 APHA-AWWA-WEF. Part 3125

Compiled November 6, 2009 GS.

SRC Analytical Laboratories

Standard Operating Procedure Summary

Lead-210 in Various Matrices by Beta Counting of the Bismuth-210 Successor Product

SOP Number: **Rad-101**

Summary:

Lead-210 is determined indirectly by the precipitation and counting of its high energy beta emitting progeny, Bismuth-210. Following a digestion (using nitric and perchloric acids for liquid samples and the five acid digestion (Aqua Regia, perchloric , hydrofluoric and sulfuric acids) for solid samples), bismuth is isolated by solvent extraction and subsequently precipitated as bismuth oxychloride. The precipitate is collected on a filter paper/disk assembly and beta counted in a low background counting system (Berthold LB770 Gas Flow Proportional Counter)

Scope and Detection Limit:

This method may be used on a variety of sample types in conjunction with proper initial preparation procedures. The reportable detection limit for a 1 litre water sample is 0.02 Bq/L. The reportable detection limit for a 1 gram solid sample is 0.02 Bq/g.

Sample Requirements

For water samples, a sample size of 1 litre is normally required. Water samples must be preserved with nitric acid to a pH of <2. For soil or sediment samples, a sample size of 0.5 grams is normally required. Holding time for water samples is 6 months. Holding time for solid samples is indefinite.

Quality Control:

For each set of samples a blank, a control sample and a calibration check standard are analyzed. One of every ten samples (10% of all samples) is analyzed in duplicate, if sufficient sample is available. Each sample is spiked with a known quantity of stable (non-radioactive) bismuth which is used to determine the recovery after sample processing. The bismuth recovery is suspect if it is less than 25% or greater than 100%. All quality control results must be within specified limits otherwise corrective action is required.

References:

National Uranium Tailings Program (NUTP) Radioanalytical Methods Manual, N.W. Chiu and J.R. Dean, Canadian Centre for Mineral and Energy Technology (CANMET), Canadian Government Publishing Centre, 1986.

CANMET Report 78-22.

Standard Methods for the Examination of Water and Wastewater, 21st Ed, APHA, AWWA, WEF, 2005.

Compiled November 6, 2009 GS.

SRC Analytical Laboratories

Standard Operating Procedure Summary

Polonium-210 in Water, Solids and Biological Tissue by Alpha Spectroscopy

SOP Number: **Rad-103**

Summary:

Polonium-210 is plated onto a nickel disk and subsequently determined by alpha spectrometry. Alpha spectroscopy incorporates use of another alpha emitting polonium isotope (e.g. Po 209) as a tracer so that recovery can be calculated. This method may be used on a variety of sample types in conjunction with proper initial preparation procedures (e.g., digestion with nitric and perchloric acid for water samples and a five acid digestion (AquaRegia, perchloric, hydrofluoric and sulfuric acids) for solid samples.

Scope and Detection Limit:

This method is used to determine Po210. It may be used on a variety of sample types in conjunction with proper initial preparation procedures. Detection limit for a 1 litre water sample is 0.005 Bq/L. Detection limit for a 1 gram solid sample is 0.005 Bq/g.

Sample Requirements

For water samples, a sample size of 1 litre is normally required. Water samples must be preserved with nitric acid to a pH of <2. Samples for dissolved 210Po must be filtered before acidification.
For soil or sediment samples a sample size of 1 gram is normally required.
Holding time for water samples is 6 months. Holding time for solid samples is indefinite.

Quality Control:

For each set of samples a blank, a control sample, and a calibration check standard are analyzed. One of every ten samples is analyzed in duplicate if sufficient sample is available. Each sample is spiked with a known quantity of Po209 to determine the recovery. All quality control results must be within specified limits otherwise corrective action is required.

References:

Canmet Report 78-22.
Radioelement Analysis Progress and Problems, W. S. Lyon, Editor, 1979. Standard Methods for the Examination of Water and Wastewater, 21st Ed, APHA, AWWA, WEF, 2005.
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Compiled November 6, 2009 GS.

SRC Analytical Laboratories

Standard Operating Procedure Summary

<u>Radium-226 by Alpha Spectroscopy</u>

SOP Number: **Rad-105**

Summary:

All radium isotopes and other actinide and lanthanide elements in the sample solution are separated by coprecipitation with lead sulfate. The precipitate is redissolved and the radium isotopes are separated by coprecipitation with barium sulfate. The precipitate is filtered and mounted on a plastic disk. It is then counted on an alpha spectrometer. The Radium-226 alpha energy is distinct and the peak can be clearly identified.

Scope and Detection Limit:

This method can be used on water samples and a variety of different types of solid samples after suitable preparation. The detection limit is 0.005Bq/L for a 1Litre water sample and 0.01Bq/g for 0.5 grams of solid sample.

Sample Requirements

For water samples, a minimum sample size of 1 Litre is normally required. Water samples must be preserved with Nitric acid to a pHof <2.

Water samples that require dissolved radium must be filtered through a 0.45μm membrane filter before acidification. For soil or sediment samples, a minimum sample size of 0.5 gram is normally required.

Holding time for water samples is 6 months. Soils, sediments and biological samples should be kept frozen until initial preparation (e.g., drying, ashing). Holding time for dried or ashed solid samples is indefinite.

Quality Control:

For each set of samples a blank, a control sample, and a calibration check standard are analyzed. One of every ten samples is analyzed in duplicate if sufficient sample is available. Each sample is spiked with a known quantity of Barium-133 which is used to determine the recovery. All quality control results must be within specified limits otherwise corrective action is required.

References:

National Uranium Tailings Program Radioanalytical Methods Manual, N.W.Chiu and J.R. Dean, Candian Centre for Mineral and Energy Technology (CANMET), Canadian Government Publishing Centre, 1986.

Compiled November 6, 2009 GS.

SRC Analytical Laboratories

Standard Operating Procedure Summary

Thorium Isotopes by Alpha Spectroscopy

SOP Number: Rad-106

Summary:

Thorium is isolated by precipitation with barium sulfate, several cleanup steps and subsequent precipitation with ceric hydroxide. It is collected on a filter paper and the individual isotopes are determined by alpha spectrometry. The prepared sample must be counted immediately when Th227 is required, otherwise the Th228 progeny will interfere.

Scope and Detection Limit:

This method is used to determine alpha emitting isotopes of thorium including Th227, Th228, Th230, and Th232. It may be used on a variety of sample types in conjunction with proper preparation procedures. Detection limit for a 1 litre water sample is 0.01 Bq/L. Detection limit for 0.5 gram of solid sample is 0.02 Bq/g.

Sample Requirements

For water samples, a sample size of 1 Litre is normally required. Water samples should be preserved with Nitric acid to a pH of <2. Samples for dissolved thorium must be filtered through a 0.45 μm membrane filter before acidification. For soil or sediment samples a sample size of 0.5 grams is normally required.
Holding time for water samples is 6 months. Holding time for solid, vegetation and frozen animal tissue samples is indefinite.

Quality Control:

For each set of samples a blank, calibration check standard and a control sample are analyzed. One of every ten samples is analyzed in duplicate if sufficient sample is available. Each sample is spiked with a known quantity of Th234 which is used to determine the recovery. The tracer recovery is suspect if it is less than 25% or greater than 100%. All quality control results must be within specified limits othewise corrective action is required.

References:

National Uranium Tailings Program Radioanalytical Methods Manual, NUTP-3E, Canmet, 1986. Canmet Report 78-22.

Compiled November 6, 2009 GS.

Attachment C Ecological Land Classification Survey Plot Data – Vegetation

File: VSBR/Attachment C ELC Vegetation Summary

Attachment C Ecological Land Classification Survey Plot Data - Vegetation

(Note that the percentages recorded for each category of vegetation and cover type are independent of one another and are not intended to add up to 100%.)

Kiggavik Project ELC Field Plot Summary

Plot Number	Observer A	Observer B	Percent Cover (%)																		Observations
			Rock	Boulder	Cobble	Gravel	Sand	Clay/Silt	Wet Peat	Dry Peat	Water	Disturbed	Moss	Lichens	Graminoides	Forbes	Trees	Erect Shrubs	Prostrate Shrubs	Ericaceous Shrubs	
1	C. BIANCHINI	J. Aittauq											2	1	1	1		8		3	Shrub dominated site with small sedge patches. Very small sphagnum hummocks
2	C. Bianchini	K. Martee	5											15	2	15				2	
3	c. bianchini	k. martee											5	1	7	1		6	1	16	shrub dominated dry heath tundra
4	c. bianchini	k. martee		1									1	25				1		65	dry lichen - heath tundra
5	c. bianchini	k. martee	4	2									5	29	1			1		4	dry heath tundra w. bedrock
6	c. bianchini	k. martee	6	1									1	1		1		2		2	dry rock- heath lichen tundra
7	c. bianchini	k. martee	9											4	1	1		1		6	crest of hill- bedrock dominate w/ small patches of heath lichen
8	c. bianchini	k. martee											1	1	95	9		1		4	wet sedge meadow w/small hummocks and tussocks
9	c. bianchini	k. martee	8	18										1	1					1	
10	c. bianchini	k. martee		4									1	7				25		55	dry heath tundra
11	c. bianchini	k. martee		1										1	95	1		1	1	1	wet sedge meadow - small tussocks
12	c. bianchini	k. martee	75										3	7	6	2		2	1	4	bedrock heath lichen
13	c. bianchini	k. martee											1	2	92	1		2	1	3	wet segde meadow w/ small tussocks and occassional hummocks
14	c. bianchini	k. martee											5	1	1	3		4		43	hummocky heath-shrub tundra, very low-lying shrub
15	c. bianchini	k. martee	8	5									3	5	1	1		1		5	bedrock outcrop
16	c. bianchini	k. martee											1	4	23			4		32	shrubby-heath tundra with small hummocks
17	c. bianchini	k. martee	35	15									1	5	1	3		2		2	heath- rock- lichen
18	c. bianchini	k. martee											1	1	95	1		1	1	2	sedge meadow w/ small hummocks, tussocks definitely not boulder lichen
19	c. bianchini	k. martee		1									2		2			9	1	2	shrub dominated site
20	c. bianchini	k. martee											1	1	2			95		4	shrub dominated site, very tall hummocks similar to 149E
21	c. bianchini	k. martee											3		1			95		1	shrub dominated site on small hummocks and tussocks. Similar to 149E and 150E
22	c. bianchini	k. martee											1	1	1	1		8		3	low shrub dominated.. Hussocks/tussocks
23	c. bianchini	k. martee		1									1	1	5			25	5	25	hummocky/tussocky
24	c. bianchini	k. martee											35	2	8			8			shrub dominated site w/ wet sedge patches
25	c. bianchini	k. martee									1		5		95	1		1			sedge meadow/wetland, shrub on hummocks
26	c. bianchini	k. martee											2		2			9			shrub dominated site on small hummocks
27	c. bianchini	k. martee											1	1	1	8		9		2	shrub dominated site
28	c. bianchini	k. martee		1									15	1	8	1		3	1	4	sedge dominated site w/ small tussocks and hummocks
29	c. bianchini	k. martee											2	2	25			6	2	12	shrub dominated hummocky site w/ sedge in depressions
30	c. bianchini	k. martee											5	15	3	1		5		23	shrub dominated hummocky site
31	c. bianchini	k. martee									1		1		98			1		1	wet sedge tussocky meadow
32	c. bianchini	k. martee											8	1	8	2		1	1	3	sedge dominated tussocky site w/ shrubs on hummocks
33	c. bianchini	k. martee													1						wet sedge meadow
34	c. bianchini	k. martee											2	2	4			32	2	27	small hummocks, shrub/gramnoid mix
35	C. Bianchini	k. Martee											5	15	13	2		3	1	35	Dry heath hummocky shrub interspersed with some small sedge tussocks
36	C. Bianchini	K. Martee											5	1	6	2		3	1	5	Shrub hummocks with small sedge tussocks & sedge in depressions
37	C. Bianchini	K. Martee											5	1	3	1		5	1	12	Mix hummock/tussock
38	C. Bianchini	K. Martee													5	1		5			Sedge site with good willow growth on tussocks-riparian
39	C. Bianchini	K. Martee									5							1			Wet sedge meadow
40	C. Bianchini	K. Martee											1		99	1		2		2	Tussocky sedge wetland - no stream or water near site
41													15	2	1	2		3	5	4	Dry heath tundra
42	C. Bianchini	K. Martee									1				99	1		1			Sedge Wetland
43	C. Bianchini	K. Martee											25	15	5	3		2	2	33	Dry hummocky heath tundra
44	C. Bianchini	K. Martee											1	1	1	1		9	1	21	Dry heath tundra dominated by tall birch - Vigorous bluebery understorey
45	C. Bianchini	K. Martee		1									5	1	45	18		5	1	35	Dry heath/sedge tundra - disturbance adjacent to site - (road & gravel pit) - windswept - <1% boulder cover - {hoto 1130525 looking @ pit 1130526 @ rd.
46	C. Bianchini	K. Martee	3	1									2	15	1	36		1	1	4	Bedrock/boulder - lichen/heath site
47	C. Bianchini	K. Martee											1	1	8	1		3	1	4	Hummocky dry heath tundra
48	C. Bianchini	K. Martee											1	1	7	1		4		45	Dry heath tundra - similar to 1L-WL
49	C. Bianchini	K. Martee									3				97			1		1	Wet sedge meadow
50	C. Bianchini	K. Martee	7										1	15	5	2		3		1	Rock-lichen - exposed bedrock - no boulders
51	C. Bianchini	K. Martee											2	1	95			1	1		Camera Malfunction - sedge-tusock meadow
52	C. Bianchini	M. Hounjet									1		4		95			1			Camera Malfunction - sedge meadow
53	C. Bianchini	M, Hounjet		1									3	3	18	2		6	1	4	Camera Malfunction - Dry shrubby hummocky tundra

Attachment C Ecological Land Classification Survey Plot Data - Vegetation

(Note that the percentages recorded for each category of vegetation and cover type are independent of one another and are not intended to add up to 100%.)

Kiggavik Project ELC Field Plot Summary

Plot Number	Observer A	Observer B	Percent Cover (%)																		Observations
			Rock	Boulder	Cobble	Gravel	Sand	Clay/Silt	Wet Peat	Dry Peat	Water	Disturbed	Moss	Lichens	Graminoides	Forbes	Trees	Erect Shrubs	Prostrate Shrubs	Ericaceous Shrubs	
54	C. Bianchini	M. Hounjet		1									3	3	5	4		2	2	1	Camera Malfunction - Gramnoid dominated site with shrubby hummocks - no tussocks
55	C. Bianchini	M. Hounjet		1									5	2	4	3		4	8	2	Camera Malfunction - Gramnoid/shrub mixed with minor hummocks
56	C. Bianchini	M. Hounjet		1									1	3	2	2		45	18	1	Camera Malfunction - NOT a sedge wetland - nostly shrub hummocks w/ sedge tussocks in depressions
57	C. Bianchini	M. Hounjet											4	1	2	1		55	28	1	Camera Malfunction - Shrub dominated small hummocks with some small tussocks
58	C. Bianchini	M. Hounjet											2		5	1		5	25		Camera Malfunction - Complex sphagnum hummocks with small sedge tussocks surrounded by dry tundra
59	C. Bianchini	M. Hounjet											2	1	42			1	27		Camera Malfunction - Very similar to 49S except w/ more tussocks
60	C. Bianchini	M. Hounjet		4	1	2							1	7	2			1	2		Camera Malfunction - Boulder-lichen-crowberry
61	C. Bianchini	J. Aittauq											1	6	5	4		18	5	17	Dry heath tundra w/ very small hummocks & tussocks
62	C. Bianchini	J. Aittauq											1	2	75	4		5	4	2	Sedge meadow - small tussocks
63	C. Bianchini	J. Aittauq											3	1	5	25		3	1	2	Dry heath tundra - no tussocks
64	C. Bianchini	J. Aittauq											3		3	1		8			Shrub dominated site with sedge understorey
65	C. Bianchini	J. Aittauq									1		4	1	85			2	1	7	Sedge tussock meadow w/ very small slow flowing stream - ericaciuos plants on small sphagnum hummocks
66	C. Bianchini	J. Aittauq				1	1						1	1	1			8	4	19	shrub dominated low lying esker
67	C. Bianchini	J. Aittauq											2	2	2			9			Shrub dominated dry tundra - no riparian - walk from 39G-32J 1st 1.6km tussocks - last 400m hummocks
68	C. Bianchini	J. Aittauq											25	1	9	2		3	3	2	Dry heath tundra - no tussocks
69	C. Bianchini	J. Aitauq		2								1	2	4	2					55	Dry heath-lichen tundra
70	C. Bianchini	J. Aittauq		2	1								2	25	3					55	Dry heath - lichen tundra w/ some boulders - very similar to 34Y
71	C. Bianchini	J. Aittauq		1									1	1	7			2		35	Sedge tussock dominated w/ some heath
72	C. Bianchini	J. Aittauq										1		1	2			5	2	19	Hummocky shrub site
73	D. Power	J. Aittauq											5	2	15	3		1		18	Heath tundra w/ low hummocks
74	D. Power	J. Aittauq						1						1	6	1		75		12	Abundant low shrubs
75	D. Power	J. Aittauq											1	2	25	1		5		1	
76	D. Power	J. Aittauq											75	1	1	1		1		15	
77	D. Power	J. Aittauq											1		65			2		5	
78	D. Power	J. Aittauq											1	1	5	5		5		3	
79	D. Power	J. Aittauq	1										1	1	97	1			1	2	Hummock sedge wetland
80	D. Power		6					5						5	1					3	
81	D. Power	J. Aittauq	95																	5	No photos taken
82	D. Power	J. Aittauq	1					3						1						7	
83	D. Power	J. Aittauq		9										71						9	
84	D. Power	J. Aittauq	8										1	2	1			1		15	rocky outcrop - mostly exposed bedrock
85	D. Power	J. Aittauq											1		2			75			
86	D. Power	J. Aittauq													99			1			
87	D. Power	J. Aittauq		15						99			5	34	1	1		5	1	54	
88	D. Power	J. Aittauq											3	1	2	7		2	35	2	
89	D. Power	J. Aittauq											1					8		3	
90	D. Power	J. Aittauq											1		99			1			
91	D. Power	J. Aittauq													99						
92	D. Power	J. Aittauq											5	1		8		1		15	
93	D. Power	J. Aittauq											5		8			15			
94	C. Bianchini			1									5	2	5	1		85	1	1	Scrub birch dominated site w/ patches of gramnoids
95	C. Bianchini												1	2	38			42	1	1	Patchy veg of scrub birch/moss/lichen & gramnoids
96	C. Bianchini	J. Aittauq											1	1	95	1		4			Wet sedge meadow w/ occasional raised dry site
97	C. Bianchini	J. Aittauq											1	1	7			3			Graminoid dominated w/ shrubby hummocks
98	C. Bianchini	M. Hounjet											15	1	2	5		43	5	2	Small hummocks - no tussocks
99	C. bianchini	M. Hounjet											1	1	95	1		2	1	1	Sedge dominated riparian area w/ occasional large shrubby hummocks
100	C. Bianchni	M. Hounjet		1									2	5	5			55	5	1	Very hummocky shrub dominated site
101	C. Bianchini	M. Hounjet		1									3	1	5	2		3	15	1	Dry heath tundra w/ small hummocks
102	C. Bianchini	M. Hounjet		3									2	1	3	2		9	8	2	Camera malfunction - Dry hummock site w/ occasional boulders
103	C. Bianchini	M. Hounjet		8									1	5	5	2		2	3	2	Camera malfunction - Dry tundra w/ frost boils & boulders
104	C. Bianchini	M. Hounjet		1									2	1	95	1		3	1	1	Camera malfunction - Sedge meadow w/ occasional shrub hummock - definitely NOT Boulder-Lichen

Attachment C Ecological Land Classification Survey Plot Data - Vegetation

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Kiggavik Project ELC Field Plot Summary

Plot Number	Observer A	Observer B	Percent Cover (%)																		Observations
			Rock	Boulder	Cobble	Gravel	Sand	Clay/Silt	Wet Peat	Dry Peat	Water	Disturbed	Moss	Lichens	Graminoides	Forbes	Trees	Erect Shrubs	Prostrate Shrubs	Ericaceous Shrubs	
105	C. Bianchini	M. Hounjet		5									1	1	2			3	8		Camera malfunction - Boulder-Lichen - Morainal flow
106	C. Bianchini	M. Hounjet		1									15	3	4						Camera malfunction - Dry tundra w/ occasional frost boil & boulders
107	D. Power	C. Bianchini	2	2									1	1	45	5		4	3	7	
108	C. Bianchini	D. Power	5	2									1	65	2					3	Exposed congomerate bedrock - well worn and windswept - limited soil and veg. development
109	C. Bianchini	D. Power	1	3	1									7	1				7	7	Gravel/Boulder rock outcrop - wind swept - minimal vegetation development
110	C. Bianchini	D. Power	1	4		2								65	1	1		15	1	32	Windswept bedrock outcrop w/ many boulders and exposed soil - limited vegetation
111	C. Bianchini	D. Power	1		2	25							2		7	1	1		2	36	Low lying bedrock outcrop - mostly covered in gravel - limited soil and veg. development in depressions
112	C. Bianchini	D. Power	25	4		1							15	4	1	1		25		7	Large bedrock outcrop dominated by fractured boulders - limited soil and veg. development
113	C. Bianchini	D. Power	1											6	1	1				25	Slanted fractured bedrock
114	C. Bianchini	D. Power	4		3								1	1	3	15		1			Fractured bedrock outcrop w/ lots of cobbles
115	C. Bianchini	D. Power	6		2								1	35	1	3		4		13	Very low rising bedrock outcrop
116	C. Bianchini	D. Power	7										1	7	15	1		1		11	Windswept bedrock 'island' - nearest outcrop approx. 3km away
117	C. Bianchini	D. Power	8	1									1	85	1	2		1		25	Windswept bedrock outcrop?
118	C. Bianchini	D. Power	45		1								1	51	1	1					Exposed bedrock outcrop w/ limited soil and veg.
119	C. Bianchini	D. Power	1			1							2	1	5	1		3	15	5	Bedrock outcrop w/ vegetation in depressions
120	C. Bianchini	D. Power	3	1									3	7	2	6					Windswept bedrock outcrop w/ shallow soils and veg. in depressions
121	C. Bianchini	D. Power	95										3	8	1	1				2	Fracture bedrock outcrop w/ lifted boulder fragments. <1% veg. and soi
122	D. Power	I. Rossman	5		15	5							15		5					25	High outcrop of bedrock (108m ASL) and cobbles. Small patches of vegetation. Little forage for caribou. Main value insect avoidance. Hare pellets
123	D. Power	I. Rossman	85										3	3	1	7		1		5	Predominantly bedrock w/ patches of sparse veg. Main value as inset avoidance. Hare pellets and goose droppings.
124	D. Power	I. Rossman	6										2	9	1	2				2	No caribou signs. A bedrock outcrop w/ little vegetation. Mainly insect avoidance.
125	C. Bianchini	D. Power	24	1									1	75	1	1				4	Bedrock ridge w/ shallow soils. Exposed gravel throughout w/ xeric, low lying veg. Quad trails near ?
126	D. Power	I. Rossman	3										1	65	1				15	13	Low relief bedrock outcrop. 1 Caribou carcass. Caribou pellets. Good Cetraria site but poor in orther forage species.
127			85										1	75	1	2		8		7	Rounded, windswept rock outcrop. No cliffs. Some cobbles and gravles. Limited soil and veg. development.
128	C. Bianchini	K. Marte	9	5									1	2	1	1		1	1	2	Rounded bedrock outcrop w/ some fracture. Limited soil and veg. development
129	C. Bianchini	K. Marte	5	5	1	1						5	2	15	1			1		2	Windswept exposed bedrock w/ some (50%) shallow soil development.
130	C. Bianchini	D. Power	85	5									2	4	1					5	Windswept bedrock outcrop w/ very little soil and veg.
131	C. Bianchini	D. Power	3	6									2	3		1			2	2	Broken bedrock outcrop w/ many boulders - very windswept
132	C. Bianchini	K. Marte	3	5									2	2	3	2		1		1	Fractured windswept bedrock outcrop w/ many boulders
133	C. Bianchini	K. Marte	3	2	4								3	1	3	2				2	Exposed bedrock - windswept ridge w/ some cobbles and boulders - evidence of old beaches above and below
134	C. Bianchini	K. Martee	7	5	2								1	1	1	1		1		1	Broken/eroded bedrock outcrop w/ evidence of old beaches above and below. Boulders, cobbles and gravel present.
135	C. Bianchini	D. Power	8			1								1	1			25		35	Top of bedrock outcrop - proposed quarry site
136	C. Bianchini	D. Power	9			1							1	11	1	1		1	4	35	Bedrock outcrop - proposed quarry site
137	C. Bianchini	D. Power	25	1									1	55	1			25		32	Tilted, broken rock outcrop w/ scattered boulders. Limited soil & veg. development in depressions.
138	C. Bianchini	D. Power		2		5								1	1			15		13	Eroded bedrock outcrop, gravelly w/ boulders.
139	C. Bianchini	D. Power		4									7	6	2	1		5	2	1	Dry hummocky heath tundra w/ extensive boulders, almost frozen to surface.
140	C. Bianchini	D. Power		25									1	2	75	3		2	5	5	Undulating irregular tundra w/ many large scattered boulders above and below surface - organic on glacial till
141	C. Bianchini	D. Power	1										7	25	75	1		45	5	2	Sedge/shrub hummocky tundra w/ occassional boulders surface. Over frozen ? mineral soil.

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Plot Number	Observer A	Observer B	Percent Cover (%)																		Observations
			Rock	Boulder	Cobble	Gravel	Sand	Clay/Silt	Wet Peat	Dry Peat	Water	Disturbed	Moss	Lichens	Graminoides	Forbes	Trees	Erect Shrubs	Prostrate Shrubs	Ericaceous Shrubs	
142	C. Bianchini	D. Power		1									1	4	4			15	15	9	Hummocky heath dominated tundra w/ many scattered boulders at surface over well drained soil (gravel, sand, clay/silt substrates)
143	C. Bianchini	D. Power											1	1	95	1		3		1	Sedge dominated plateau w/ shrubs on hummocks - thick organic layer over frozen mineral layer
144	C. Bianchini	D. Power				9		2						2	1						Esker, fuel cache. Very well drained soils.
145	C. Bianchini	D. Power											5	1	85	5		1		5	Hummoncky heath tundra w/ abundant sedge over carved till.
146				1	1								2		95	1		35		5	Sedge dominated site w/ shrub hummock organic over well drained sand. Water flowing through @ 37cm depth.
147	C. Bianchini	D. Power											5	1	8			2	1	4	Shrub/sedge dominated hummocky site over ? frozen soils
148	C. Bianchini	D. Power		5									1	1	5			35	1	3	Dry morainal plateau w/ scattered boulders - was shallow melt-water lake, now dry
149	C. Bianchini	D. Power		8									1	9	1	1			1	5	Undulating boulder field. Very red, shallow, sandy soils w/ some gravel & pebbles. 20cm to permafrost
150	D. Power	C. Bianchini		3										25	1			1	1	35	Site moved 130m SW from original site which was in lake. Moved to representative habitat: morainal dry plateau w/ lots of scattered boulders
151	D. Power	C. Bianchini	1	1		1				1			6	2	5	1		4	6	1	
152	C. Bianchini	D. Power		25										11	15			5	1	4	Birch dominated site w/ sedge tussocks
153	C. Bianchini	D. Power	1	75									1	85	1	1		5	1	15	Undulating morainal blanket/plateau. Fairly deep soil (>40cm), some pebbles/gravels & cobbles. Some leaching into A layer; no obvious layering - B blends into C
154	C. Bianchini	D. Power		1									2	35	95			5		5	Sedge dominated site on iron rich (very red) well drained soils
155	C. Bianchini	D. Power		1		3							2	1	25	1		7	5	1	Shrub dominated hummocky plateau on silty-clay loam frozen @ 10cm.
156	C. Bianchini	D. Power	1	1									1	1	95	1		5		1	Sedge dominated plateau on wet churned soils w/ water seeping @ 40cm. Substrates: Gravel, Clay/Silt, Sand.
157	C. Bianchini	D. Power											1	1	75			15	1	2	Shrub hummocks interspersed w/ sedge on farily well drained site. Very red soils - high mineral content. Substrates: Gravel, Clay/Silt, Sand.
158	C. Bianchini	D. Power											1	5	1	1		15	5	2	Dry heath tundra on well drained site. Substrates: Gravel, Sand, Clay/Silt, Glacial Till
159	D. Power	C. Bianchini											1	5	5	1		5	3	52	Heath Tundra on well drained soils. No Substrate specified.
160	C. Bianchini	D. Power											1	5	9	2		1	1	1	Sedge dominated hummocky plateau. No Substrate specified.
161	C. Bianchini	D. Power											1	1	65	1		3	5	1	Hummocky sedge dominated slope w/ scattered boulders on surface. Substrates: Cobbles, Gravel, Clay/Silt, Glacial Till
162	C. Bianchini	D. Power		3									1		95	9		5	1	1	Hummocky sedge dominated site w/ boulders scattered on surface over gravel-cobble. Well drained glacial till.
163				6										5	1	1		5		35	Heath lichen boulder field on sandy churned soils w/ large cobbles & boulders.
164	C. Bianchini	D. Power		1										1	4			5	1	1	Shrub dominated hummocky slope w/ scattered boulders.
165	C. Bianchini	D. Power											25	25	4	5		2	5	5	Hummock sedge/shrub slope on frozen soil. No Substrate specified.
166	C. Bianchini	D. Power											5	1	2	1		65	15	5	Shrub dominated hummock slope. Lots of frost heaving. Farily well drained soils w/ frozen spots. No Substrate specified.
167	C. Bianchini	D. Power	1										1	25	6	1		1	25	7	Hummock heath tundra w/ scattered boulders & cobbles on surface. Very poor soil dev't - mostly angular gravel.
168	C. Bianchini	D. Power											8		1	1		8	1	57	Shrub dominated hummocky plateau over frozen soils. Substrates: Gravel, Sand, Clay/Silt
169													1		95	6		5	1	1	Sedge dominated 'valley' bottom. Soils from solid @ 29cm.
170													3		4	1		55	5		Transition from heath tundra to sedge. Thick organic layer w/ fairly deep rooting. Partial frozen mineral layer. Substrates: Cobbles, Gravel, Clay/Silt
171	C. Bianchini	D. Power		2									15		1	1		1	6	7	Dry heath tundra w/ peaty/shrubby hummocks on compact poor soils. Substrates: Gravel, Sand, Clay/Silt
172	C. Bianchini	D. Power		1									1	1	3	1			52	16	Dry heath tundra on very well drained soil. Substrates: Gravel, Sand, Clay/Silt
173	C. Bianchini	D. Power											5	2	1	5		5		2	Crest position on health tundra over churned, well drained but poorly dev't soils. Substrates: Boulders, Cobbles, Gravel, Sand, Clay/Silt
174	C. Bianchini	D. Power								1			15		99	1		3		2	Sedge dominated edge of pond w/ many large hummocks. Substrates: gravel, sand, clay/silt.

Attachment C Ecological Land Classification Survey Plot Data - Vegetation

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Kiggavik Project ELC Field Plot Summary

Plot Number	Observer A	Observer B	Percent Cover (%)																		Observations
			Rock	Boulder	Cobble	Gravel	Sand	Clay/Silt	Wet Peat	Dry Peat	Water	Disturbed	Moss	Lichens	Graminoides	Forbes	Trees	Erect Shrubs	Prostrate Shrubs	Ericaceous Shrubs	
175	C. Bianchini	D. Power											5	5	1	2		65	1	1	Very shrubby-hummock site on glacial till.
176	C. Bianchini	D. Power											1		7	1		3			Transition from shrubby hummocks to sedge. Thick organic over till.
177	C. Bianchini	D. Power		2		1							15	1	15	1		55	8	6	Transition: shrubby/dry hummock w/ sedge/moss depressions over compact soil w/ thick organic layer. Substrates: gravel, sand, clay/silt.
178	C. Bianchini	D. Power		5		2							5	1	5	1		5	55	13	Dry heath tundra w/ boulder patches over glacial till. Substrates: gravel, sand, glacial till.
179	C. Bianchini	D. Power											2		1	1		75	5	5	Shrub dominated hummocky site w/ sedges in depression. Thick organic layer over frozen mineral soil. Other substrates: glacial till.
180	C. Bianchini	D. Power		1	5								2	4	1	1			1	32	Dry heath tundra over frozen soils. Other substrates: clay/silt
181	C. Bianchini	D. Power		5									2	6	5	1		37	3	2	Transition from dry to wet. Large dry shrubby hummock w/ sedgy depressions. Other substrates: sand, clay/silt, glacial till.
182	C. Bianchini	D. Power		1	1								1	1	25	1		65	5	5	Shrub hummock site w/ scattered, partially burried boulders @ surface over extreme glacial till. Other substrates: cobbles, gravel, sand.
183	C. Bianchini	D. Power			1								3	1	65	1		4	1	1	Shrub hummock / sedge depression over thick organic peat layer of moss & graminoids, mixed w/ heavy till. Other substrates: boulders, gravel, moss peat.
184	C. Bianchini	D. Power		1									3	1	1	1		35	5	35	Between xeric & mesic. Dry heath tundra w/ thick moss layer. Scattered boulders @ surface. Other substrates: cobbles, gravel, sand.
185	C. Bianchini	D. Power			1					2			5	1	4	1		2	2	11	Large dry hummocks w/ sedge depressions. Organic soil over sandy mineral soil. Other substrates: cobbles.
186	C. Bianchini	D. Power								1			2	5	5	1		7		3	Hummocky heath tundra w/ birch on hummocks over very frozen soil near surface. Other substrates: clay/silt
187	C. Bianchini	D. Power								3			1	2	1	3		75	5	17	Very shrubby/hummocky site over thin till veneer & frozen soils. Other substrates: sand.
188	C. Bianchini	D. Power								1			3	1	2			85	5	15	Very shrubby site w/ many low hummocks over thin til veneer and frozen mineral soils. Other substrates: cobbles, gravel, sand.
189	C. Bianchini	D. Power				5							1	1	1	1		18	2	8	Moraine ridge w/ exposed soils. Undulating, very sandy and well drained. Limited soil dev't. Other substrates: boulders, cobbles, gravel.
190	C. Bianchini	D. Power			1	1				2			4	2	1	1		5		23	Hummocky heath tundra over churned, well drained soils/till. Other substrates: cobbles, gravel, sand.
191	C. Bianchini	D. Power		1									5	1	8	1		3		6	Small hummocks w/ shurbs. More sedge than shrub over frozen mineral soil. Other substrates: sand.

Government of Nunavut ELC Field Plot Summary

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			Rock	Boulder	Cobble	Gravel	Sand	Clay/Silt	Wet Peat	Dry Peat	Water	Disturbed	Moss	Lichens	Graminoides	Forbes	Trees	Erect Shrubs	Prostrate Shrubs	Ericaceous Shrubs	
958	Jonathan Pameolik	Mitch Campbell		2	2	2				1			2	5	2	2				3	Caribou Dung
959	Jonathan Pameolik	Mitch Campbell		2	1	1			1	1			3	3	3			15		3	Antler and Dung
960	Jonathan Pameolik	Mitch Campbell			2	5	1			1			2	3	5	2		15		4	
961	Jonathan Pameolik	Mitch Campbell		5	1	5	1		1				25	2	1	2		2		4	
962	Jonathan Pameolik	Mitch Campbell		5	2	5	5			1			1	15	2	1		5	2	2	
963	Jonathan Pameolik	Mitch Campbell		5		2	1	1					3	2	1			2	5	5	
964	Jonathan Pameolik	Mitch Campbell	1	6							2		1	2	2			2	1	1	
965	Jonathan Pameolik	Mitch Campbell		5	1	5	2	2					2	35	5	2		2		3	
966	Jonathan Pameolik	Mitch Campbell	2	3	2	2		2					1	35	5	2		1		3	
967	Jonathan Pameolik	Mitch Campbell		1		15							5	7	5	5			1	2	Flat and Level because on top of hill

Attachment C Ecological Land Classification Survey Plot Data - Vegetation

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Kiggavik Project ELC Field Plot Summary

Plot Number	Observer A	Observer B	Percent Cover (%)																		Observations
			Rock	Boulder	Cobble	Gravel	Sand	Clay/Silt	Wet Peat	Dry Peat	Water	Disturbed	Moss	Lichens	Graminoides	Forbes	Trees	Erect Shrubs	Prostrate Shrubs	Ericaceous Shrubs	
968	Jonathan Pameolik	Mitch Campbell		2		2							3	15	15	2		2		5	
969	Jonathan Pameolik	Mitch Campbell		2		15	1	1				2	3	1	1	15		2	1	25	
970	Jonathan Pameolik	Mitch Campbell		7									5	25	5	5				1	
971	Jonathan Pameolik	Mitch Campbell		2		2		2		2			15	5	15			3	15	4	
972	Jonathan Pameolik	Mitch Campbell		3	2	2	2	2					1	1	1			1		45	
973	Jonathan Pameolik	Mitch Campbell		5	2	2		2	2				15	1	1	5		5	5	65	
974	Jonathan Pameolik	Mitch Campbell		2		1							5	7	5	2			2	25	Flat Because on top
975	Jonathan Pameolik	Mitch Campbell		1									1	1	1	1		1		1	
976	Jonathan Pameolik	Mitch Campbell		4	2	2		2		1			1	3	5	2		25	5	25	
977	Jonathan Pameolik	Mitch Campbell		5		5		2					2	15	2	2		3		3	Caribou Antler
978	Jonathan Pameolik	Mitch Campbell		2		1							5	6	5	1		2		15	Flat Because on top of hill
979	Jonathan Pameolik	Mitch Campbell		5		5	1	2		1			3	1	2			25	5	4	
980	Jonathan Pameolik	Mitch Campbell		2		5		2		2			15	1	3	2		15	5	45	Muskox close to site
981	Jonathan Pameolik	Mitch Campbell		2	2	5		2		1			35	15	2	5		2	2	35	Tussocky Tundra
982	Jonathan Pameolik	Mitch Campbell						2					1	3	6			1		15	
983	Jonathan Pameolik	Mitch Campbell		5		2	2	1	1	1		2	1	1	3	25			1	15	
984	Jonathan Pameolik	Mitch Campbell		15		5		2		2			15	2	2	2		2	15	4	Edge of Boulder Field
985	Jonathan Pameolik	Mitch Campbell		5		1		1					1	1	7	15		5	5	3	Site was on edge, moved over to a flatter mesic site right next to it.
986	Jonathan Pameolik	Mitch Campbell			1	2	2	2		1		5	5	6	15	15		1		5	
987	Jonathan Pameolik	Mitch Campbell		2		5	1						1	5	15	2		5	1	4	
988	Jonathan Pameolik	Mitch Campbell		2		5				1			5	4	2	2				3	
989	Jonathan Pameolik	Mitch Campbell	1	2	5								2	5	2	5		2		1	
990	Jonathan Pameolik	Mitch Campbell	1	2	5	1		2		2			5	3	1	3		5		2	
991	Jonathan Pameolik	Mitch Campbell							1		1		9		1	2		9		1	
992	Jonathan Pameolik	Mitch Campbell		5				2	1				2	1	7	2		1	1	4	
993	Jonathan Pameolik	Mitch Campbell		2									4	2	1	15		1	5	3	
994	Jonathan Pameolik	Mitch Campbell							1	1	2		2	2	6			5		3	Tussocky Tundra
995	Jonathan Pameolik	Mitch Campbell		2									4	25	1	1		15	2	4	
996	Jonathan Pameolik	Mitch Campbell		5		1	1	1		1			3	2	15	15		1	1	3	
997	Jonathan Pameolik	Mitch Campbell		2					2		1		2	2	9	5		2	2	5	Site is to the north of datasheet waypoint Hummocky Tundra

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Kiggavik Project ELC Field Plot Summary

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			Rock	Boulder	Cobble	Gravel	Sand	Clay/Silt	Wet Peat	Dry Peat	Water	Disturbed	Moss	Lichens	Graminoides	Forbes	Trees	Erect Shrubs	Prostrate Shrubs	Ericaceous Shrubs	
998	Jonathan Pameolik	Mitch Campbell		1					1		1		1	2	9	5		2	5	5	Site is little north of where the waypoint is indicated
999	Jonathan Pameolik	Mitch Campbell		1									3	15	3	15		1	1	3	
1000	Jonathan Pameolik	Mitch Campbell		5	2	5		2		1			3	3	1	2		5	5	25	
1001	Jonathan Pameolik	Mitch Campbell		5		5		2		1			1	2	1	2		5	5	45	
1002	Jonathan Pameolik	Mitch Campbell		2	2				1				1	25	3	1		15	5	3	
1003	Jonathan Pameolik	Mitch Campbell						5	2		2		5		9	2		3	5		
1004	Jonathan Pameolik	Mitch Campbell									2		2		5			95			Ptarmigan
1005	Jonathan Pameolik	Mitch Campbell			5			5	2				5	5	6	15		3	2	5	
1006	Jonathan Pameolik	Mitch Campbell		2	2			1	2				25	1	5	1		3	5	2	
1007	Jonathan Pameolik	Mitch Campbell			2	2			2	2			2	15	5	2		1	5	1	
1008	Jonathan Pameolik	Mitch Campbell		2		2		2	1	1			1	15	5	15		15	5	1	
1009	Jonathan Pameolik	Mitch Campbell		2		5		2		2			2	15	15	15		2	5	1	
1010	Jonathan Pameolik	Mitch Campbell			2	5	1	5	1	2			35	1	5	5		3	5	2	Betula field with Frost Boils
1011	Jonathan Pameolik	Mitch Campbell		2		2		2		2			65	1	1	5		8		2	
1012	Jonathan Pameolik	Mitch Campbell		2		5	1	5		2			3	1	1	5		6	2	2	Muskox on Site
1013	Jonathan Pameolik	Mitch Campbell		5	2	5	2	2		1			3	15	1	2		3	5	35	
1014	Jonathan Pameolik	Mitch Campbell		2	2	2		2		5			2	3	1	2		5		3	Site to North East of Site on waypoint (slight)
1015	Jonathan Pameolik	Mitch Campbell			2	2		2		2			4	15	5	2		4	2	3	
1016	Jonathan Pameolik	Mitch Campbell		5	2	2		2	2		1		1	5	5	5		4	5	1	
1017	Jonathan Pameolik	Mitch Campbell		2		2		2	2				1	5	8	1		5	5	2	
1018	Jonathan Pameolik	Mitch Campbell		2					2				1	2	95			5	2		
1019	Jonathan Pameolik	Mitch Campbell		2		2		2					25	2	1	2		5	5	15	
1020	Jonathan Pameolik	Mitch Campbell		2					2				25	4	15	1		2		35	Off to SouthEast
1021	Jonathan Pameolik	Mitch Campbell							5		5		5		95	2		5	1		
1022	Jonathan Pameolik	Mitch Campbell		5	5			2	5				1	5	6	5		1	5	5	
1023	Jonathan Pameolik	Mitch Campbell		2	2	2		2	2				1	5	8	5		15	1	5	
1024	Jonathan Pameolik	Mitch Campbell		2									6	3	1	2		55	2	15	
1025	Jonathan Pameolik	Mitch Campbell		5	2	2	2	1		5		2	1	15	5	5		15	5	5	
1026	Jonathan Pameolik	Mitch Campbell				2		2			5		5	1	15	2		9	2		Caribou on site
1027	Jonathan Pameolik	Mitch Campbell		5	2	2		2		2			4	1	1	5		4	5	2	

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			Rock	Boulder	Cobble	Gravel	Sand	Clay/Silt	Wet Peat	Dry Peat	Water	Disturbed	Moss	Lichens	Graminoides	Forbes	Trees	Erect Shrubs	Prostrate Shrubs	Ericaceous Shrubs	
1028	Jonathan Pameolik	Mitch Campbell		5	2	5		2		2			3	1	15	1		5	2	3	
1029	Jonathan Pameolik	Mitch Campbell		2	2			2	5	2			5		85	5		5			
1030	Jonathan Pameolik	Mitch Campbell				2		2		5			2	1	5	25		1	1	15	
1031	Jonathan Pameolik	Mitch Campbell		2	5	1		2		2			1	2	25	15		5	5	1	
1032	Jonathan Pameolik	Mitch Campbell			2	1	2	2		2		2	1	15	2	1		5	5	15	Caribou Scat
1033	Jonathan Pameolik	Mitch Campbell		2	2	5		2		2			1	1	75	5		15	5	5	
1034	Jonathan Pameolik	Mitch Campbell			2	2		2		2			1	15	35	35		1	5	5	
1035	Jonathan Pameolik	Mitch Campbell		2	2	5		2		5			1	15	3	15		1	5	1	
1036	Jonathan Pameolik	Mitch Campbell		2	5	2		2		2			1	1	65	1		1	2	1	
1037	Jonathan Pameolik	Mitch Campbell		2			2	2		2			5	5	8	15		5	5	5	Ptarmigan
1038	Jonathan Pameolik	Mitch Campbell		2	2	2		2		5			1	2	4	1		5	5	2	
1039	Jonathan Pameolik	Mitch Campbell		2	2	5		1		2			1	5	7	15		5	5	5	
1040	Jonathan Pameolik	Mitch Campbell		2	2	5	1			5			2	5	3	1		2	5	1	
1041	Jonathan Pameolik	Mitch Campbell		2		2				2			5	5	6	1		1	5	1	
1042	Jonathan Pameolik	Mitch Campbell		2		5	2	5		2			1	2	2	5		1	5	3	
1043	Jonathan Pameolik	Mitch Campbell		2	2	1			5				5	5	8	2		5	5	5	Ptarmigan
1044	Jonathan Pameolik	Mitch Campbell									15		8		7	5		2			
1045	Jonathan Pameolik	Mitch Campbell							5		5		5		9			5	5		Ptarmigan On site, Lowland other is Graminoide Flat
1046	Jonathan Pameolik	Mitch Campbell							2		1				9	2		2			Several Caribou Trails
1047	Jonathan Pameolik	Mitch Campbell											6		3	2		75	5		
1048	Jonathan Pameolik	Mitch Campbell			2	1	2	2		2			2	25	2	5		5	2	2	
1049	Jonathan Pameolik	Mitch Campbell				2	5	5		5			2	2	1	5		5	2	2	
1050	Jonathan Pameolik	Mitch Campbell				2	2	2		2			3	2	2			25		15	
1051	Jonathan Pameolik	Mitch Campbell		1	2	1		2		2			5	6	5			1		3	
1052	Jonathan Pameolik	Mitch Campbell	8	5										15	2					5	
1053	Jonathan Pameolik	Mitch Campbell		4	5	1	1	1					5	4	2					15	
1054	Jonathan Pameolik	Mitch Campbell		2					2		1		5	5	8	5		2	2	5	
1055	Jonathan Pameolik	Mitch Campbell		2		2			2		2		5	5	8	1		2		2	
1056	Jonathan Pameolik	Mitch Campbell		2	2	1	5						5	7	2					2	Off Site slightly
1057	Jonathan Pameolik	Mitch Campbell											1	2	25	2		5	5	25	

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			Rock	Boulder	Cobble	Gravel	Sand	Clay/Silt	Wet Peat	Dry Peat	Water	Disturbed	Moss	Lichens	Graminoides	Forbes	Trees	Erect Shrubs	Prostrate Shrubs	Ericaceous Shrubs	
1058	Jonathan Pameolik	Mitch Campbell	5	2		2							2	5	15	15				1	Bedrock outcrop on old beach ridge, flat cause on top of ridge
1059	Jonathan Pameolik	Mitch Campbell		5	2	5							5	4	2	15				3	
1060	Jonathan Pameolik	Mitch Campbell							2				9	2	15			1	5	25	Habitat on top edge of aerial shot
1061	Jonathan Pameolik	Mitch Campbell									1		5		9			2	1		
1062	Jonathan Pameolik	Mitch Campbell									1		15		85	5			2	5	
1063	Jonathan Pameolik	Mitch Campbell							5		5		9		1	5			5		Waypoint north of point
1064	Jonathan Pameolik	Mitch Campbell							5		2		9		1			1	2	15	
1065	Jonathan Pameolik	Mitch Campbell							2	2	2		2	9	5			2		1	East of Site
1066	Jonathan Pameolik	Mitch Campbell			95									2	1					2	
1067	Jonathan Pameolik	Mitch Campbell		2	8								5	1	2	5				1	
1068	Jonathan Pameolik	Mitch Campbell				4							2	4	2	2				15	Waypoint is to the east
1069	Jonathan Pameolik	Mitch Campbell				5					2		5	5	15	2		4	2	2	Patchy Graminoide Site
1070	Jonathan Pameolik	Mitch Campbell			2	3	2						2	6						1	
1071	Jonathan Pameolik	Mitch Campbell	5	5		5							2	35	1	2		2		1	Off to North
1072	Jonathan Pameolik	Mitch Campbell				2			2		5		4	1	1	2		6		3	
1073	Jonathan Pameolik	Mitch Campbell				85	1						1	1	1	1		1		1	
1098	Jonathan Pameolik	Mitch Campbell		1	2	2	2			2			5	5	5			2	2	2	Flat because on top, Bouldery Ridge with Frost Boils
1099	Jonathan Pameolik	Mitch Campbell		9							1					1					Exposed Boulders Adjacent to summer ice, Late Snow Melt
1100	Jonathan Pameolik	Mitch Campbell							2		5		25	2	5			4	5	1	Waypoint off to north, Betula Field
1101	Jonathan Pameolik	Mitch Campbell		5	2	5		2	2				4	25	15			15	5	15	
1102	Jonathan Pameolik	Mitch Campbell		5		1				2			5	2	15			5	1	25	
1103	Jonathan Pameolik	Mitch Campbell		5							5		1	2	2			5		3	
1104	Jonathan Pameolik	Mitch Campbell		6	2								2	4	1					1	Flat Because on top
1105	Jonathan Pameolik	Mitch Campbell		2	2	1				2			15	25	15			2		25	
1106	Jonathan Pameolik	Mitch Campbell		4										5	2			5	2	2	
1107	Jonathan Pameolik	Mitch Campbell		5					2	2	5		2	5	3			5	2	5	
1108	Jonathan Pameolik	Mitch Campbell							5		25		3		7						
1109	Jonathan Pameolik	Mitch Campbell		2		5	2		2		2		5	7	5	1				15	
1110	Jonathan Pameolik	Mitch Campbell		2		5	2		1	2	2		1	7	5	5				2	
1111	Jonathan Pameolik	Mitch Campbell		2		5				5		5	1	6	1					25	

Attachment C Ecological Land Classification Survey Plot Data - Vegetation

(Note that the percentages recorded for each category of vegetation and cover type are independent of one another and are not intended to add up to 100%.)

Kiggavik Project ELC Field Plot Summary

Plot Number	Observer A	Observer B	Percent Cover (%)																			Observations
			Rock	Boulder	Cobble	Gravel	Sand	Clay/Silt	Wet Peat	Dry Peat	Water	Disturbed	Moss	Lichens	Graminoides	Forbes	Trees	Erect Shrubs	Prostrate Shrubs	Ericaceous Shrubs	
1112	Jonathan Pameolik	Mitch Campbell							5		5		5	5	8			2		5	
1113	Jonathan Pameolik	Mitch Campbell				5			2	5	1	2	2	5	2	1		5		2	
1114	Jonathan Pameolik	Mitch Campbell		2	2	5				2			1	8	2					1	Flat Because on top
1115	Jonathan Pameolik	Mitch Campbell							5	2	2		1	2	8	2		2		1	
1116	Jonathan Pameolik	Mitch Campbell							1		5		5	2	7					1	
1117	Jonathan Pameolik	Mitch Campbell								2	2		5	2	7	2		2		3	
1118	Jonathan Pameolik	Mitch Campbell		1	5	5	2			1			2	3	5					5	Flat because on top
1119	Jonathan Pameolik	Mitch Campbell							5				5	2	6	2		5	5	1	Landed site is north of indicated waypoint, Drainage on side of mountain
1120	Jonathan Pameolik	Mitch Campbell		1	2	2	2			1			5	6	2					5	Caribou Scat on site
1121	Jonathan Pameolik	Mitch Campbell				5				2	1	1	1	7	5	2				1	
1122	Jonathan Pameolik	Mitch Campbell		2		5				5			25	1	5			5		3	
1123	Jonathan Pameolik	Mitch Campbell		2	2	5				5	1		4	2	2	2		65		1	
1124	Jonathan Pameolik	Mitch Campbell		2		2					1		3	1	1			2	2	4	
1125	Jonathan Pameolik	Mitch Campbell		2		2			2	2	2		2	3	5	2		15		1	Landed north of site
1126	Jonathan Pameolik	Mitch Campbell		2	2	5				5			3	3	15			1	2	2	
1127	Jonathan Pameolik	Mitch Campbell		2		5				2			5	8	15	2				1	
1128	Jonathan Pameolik	Mitch Campbell		4	5	5				1			2	45	2					1	Very Rugged
1129	Jonathan Pameolik	Mitch Campbell		2	2	5				1			2	75	2					1	
1130	Jonathan Pameolik	Mitch Campbell							5		2		3	15	5	2		5		1	North of site 100 Feet, Bottom of Boulder Ridge
1131	Jonathan Pameolik	Mitch Campbell		2	2	5			2	2	1		3	15	3			3		15	Hummock Slope
1132	Jonathan Pameolik	Mitch Campbell							2		5		4		8			1	2	2	
1133	Jonathan Pameolik	Mitch Campbell		2		2				2	2		5	7	5			5		1	
1134	Jonathan Pameolik	Mitch Campbell		2		2			2	2	1		1	25	1			1		3	
1135	Jonathan Pameolik	Mitch Campbell		3	5	5								5	2					15	
1136	Jonathan Pameolik	Mitch Campbell	3	15		1							2	4	5			2		5	
1137	Jonathan Pameolik	Mitch Campbell							2		1		5		85	2		5		5	
1138	Jonathan Pameolik	Mitch Campbell							2		5		1	2	6	2		4	2	1	
1139	Jonathan Pameolik	Mitch Campbell							2	2	2		1	2	8	5		15		1	
1140	Jonathan Pameolik	Mitch Campbell		2	2	2				2	1		7	1	5			1	2	3	
1141	Jonathan Pameolik	Mitch Campbell		2	5	2		2		2	1		4	2	1			45		2	

Attachment C Ecological Land Classification Survey Plot Data - Vegetation

(Note that the percentages recorded for each category of vegetation and cover type are independent of one another and are not intended to add up to 100%.)

Kiggavik Project ELC Field Plot Summary

Plot Number	Observer A	Observer B	Percent Cover (%)																		Observations
			Rock	Boulder	Cobble	Gravel	Sand	Clay/Silt	Wet Peat	Dry Peat	Water	Disturbed	Moss	Lichens	Graminoides	Forbes	Trees	Erect Shrubs	Prostrate Shrubs	Ericaceous Shrubs	
1142	Jonathan Pameolik	Mitch Campbell		2					2		2		4	2	6	2		2	2	1	Mossy Slope from Hill
1143	Jonathan Pameolik	Mitch Campbell		2		15							5	5	2					15	
1144	Jonathan Pameolik	Mitch Campbell							5		2	5	1		8			5		5	
1145	Jonathan Pameolik	Mitch Campbell		8									2	1	2					1	
1146	Jonathan Pameolik	Mitch Campbell			2	15				5		2	4	15	2	1		5	2	3	
1147	Jonathan Pameolik	Mitch Campbell							1		1		5	1	7			2	2	5	
1148	Jonathan Pameolik	Mitch Campbell		5		15			2	1			3	2	1	5		2	5	15	
1149	Jonathan Pameolik	Mitch Campbell		2		1		2	2	5	2		4	2	1	2		2		25	Frost Boil Hill
1150	Jonathan Pameolik	Mitch Campbell	5	1	5								2	35	1					5	North of Site, Part of Rock Outcrop green lichens on rock
1151	Jonathan Pameolik	Mitch Campbell			1									2							Light Green crustose lichens on rocks
1152	Jonathan Pameolik	Mitch Campbell	2	5	2	15								75	5			2		5	Lichen Hill, Flat Because on top
1153	Jonathan Pameolik	Mitch Campbell		5	5	2							1	6	5			2		1	Mostly Gravel and Lichen on Bedrock
1154	Jonathan Pameolik	Mitch Campbell			2	5	5	5	2	5			5	1	1	15		15	5	5	
1155	Jonathan Pameolik	Mitch Campbell							1		5		1		75			5	5	5	
1156	Jonathan Pameolik	Mitch Campbell				5	1	1	2	2	1		3	5	5	1		3		1	Ptarmigan on site
1225	Jonathan Pameolik	Mitch Campbell			3	5	5					2	4		25	1		6			Periodically Flooded Island in River
1226	Jonathan Pameolik	Mitch Campbell			3	5	5					5	3		2	2		65			Caribou Scat on site, Ptarmigan on site, River Island Periodically Flooded
1227	Jonathan Pameolik	Mitch Campbell			5	1	45			1			1	2	1					2	
1228	Jonathan Pameolik	Mitch Campbell			2	5	2			1			2	4	1					2	
1229	Jonathan Pameolik	Mitch Campbell		1	5	5	5		1		5		5	35	3			2		1	
1230	Jonathan Pameolik	Mitch Campbell		1	1		1						2	75	2					2	
1231	Jonathan Pameolik	Mitch Campbell		1		1	5						1	75	1					15	
1232	Jonathan Pameolik	Mitch Campbell		5	5	5	5		15	5	1		5	15	55			2	2	5	

Attachment D Compiled Plant Species List (1979 to 2009)

File: VSBR/Attachment D Complete Plant List

Attachment D Compiled Plant Species List (1979 to 2009)

Scientific Name	Common Name	Pre-1987 [(a)]	1987-1989[(b)]	1990[(c)]	1991[(d)]	1991[(e)]	2008 - 09	Other Names
Shrubs and Heaths								
Andromeda polifolia	andromeda sp.		x	x		x	x	
Arctostaphylos alpina	alpine bearberry		x	x	x	x		
Arctostaphylos rubra	red bearberry	x	x	x				
Arctostaphylos sp.	bearberry sp.						x	
Betula glandulosa	dwarf birch	x	x	x	x	x	x	
Cassiope tetragona	white arctic mountain heather	x	x	x	x	x	x	
Diapensia lapponica	pincushion plant						x	
Dryas integrifolia	entire-leaf mountain-avens	x	x	x	x	x		
Empetrum nigrum	black crowberry	x	x	x	x	x	x	
Kalmia polifolia	bog laurel				x	x		
Ledum decumbens	northern Labrador-tea	x	x	x	x	x	x	
Loiseleuria procumbens	alpine azalea	x	x	x			x	
Orthilia secunda	one-sided wintergreen						x	
Phyllodoce caerulea	blue mountain heather	x	x					
Rhododendron lapponicum	Lapland rosebay	x	x		x	x	x	
Rubus chamaemorus	cloudberry				x	x		
Salix alaxensis	river willow	x	x				x	Latin name is for felt-leaf willow
Salix arctica	arctic willow	x	x	x	x	x	x	
Salix arctophila	northern willow						x	
Salix cordifolia	gray willow	x	x					*Salix glauca* ssp. *callicarpaea*
Salix fuscescens	Alaska bog willow			x	x	x		
Salix herbacea	snowbed willow	x	x	x	x	x	x	
Salix lanata	wooly willow						x	
Salix planifolia	diamond leaf willow			x	x	x	x	
Salix reticulata	net leaf willow	x	x	x	x	x	x	
Salix richardsonii	Richardson's willow	x	x		x	x		*Salix lanata* ssp. *richardsonii*
Salix sp.	willow sp.	x	x				x	
Salix sp. (prostrate)	willow sp.						x	
Shepherdia canadensis	russet buffaloberry				x			
Vaccinium uliginosum	bilberry; bog blueberry	x	x	x	x	x	x	
Vaccinium vitis-idaea	lingonberry/cowberry	x	x	x	x	x	x	
Forbs								
Antennaria ekmaniana	Fries's pussytoes				x	x		*Antennaria friesiana* spp. *friesiana*
Arabis arenicola	rock-cress	x	x					
Arenaria spp.	sandwort	x	x					
Armeria maritime	thrift seapink		x	x	x	x	x	
Arnica alpina	alpine arnica						x	
Artemisia borealis	field sagewort				x	x		*Artemisia campestris* spp. *borealis* var. *borealis*
Artemisia sp.	wormword		x					
Astragalus alpinus	alpine milkvetch		x	x			x	
Astragalus eucosmus	elegant milkvetch		x					
Astragalus sp.	milkvetch			x			x	
Braya purpurascens	smooth northern rockcress	x	x					*Braya glabella* ssp. *purpurascens*
Cardamine bellidifolia	alpine bittercress	x	x		x	x		
Cardamine digitata	Richardson's bittercress			x				
Cardamine pratensis	cuckoo flower; lady's smock						x	
Caryophyllaceae	pink family	x	x					
Castilleja elegans	elegant Indian paintbrush			x	x		x	
Castilleja pallida	Indian paintbrush		x					
Castilleja raupii	Raup's Indian paintbrush					x		
Cerastium arcticum	arctic mouse-ear chickweed	x	x					
Cerastium alpinum	alpine chickweed						x	
Cerastium sp.	mouse-ear chickweed	x	x					
Cochlearia officinalis	scurvygrass	x	x					
Brassicaceae	mustard family		x					
Draba alpina	alpine draba	x	x					
Draba bellii	flat-top draba	x	x					
Draba glabella	smooth draba						x	
Draba lactea	milky draba	x	x					
Draba nivalis	yellow arctic draba				x	x		
Draba oblongata	Canadian arctic draba	x	x					
Draba sp.	draba (mountain avens)	x	x					
Dryas integrifolia	entireleaf mountain-avens						x	
Epilobium latifolium	dwarf fireweed		x		x	x	x	*Chamerion latifolium*
Erigeron humilis	arctic alpine fleabane				x			
Erigeron sp.	fleabane sp.						x	
Eutrema edwardsii	Edwards' mock wallflower	x	x	x				
Hedysarum alpinum var americanum	liquorice-root				x		x	
Hedysarum mackenziei	Mackenzie's sweetvetch		x					*Hedysarum boreale* ssp. *mackenziei*
Hedysarum sp.	sweetvetch sp.						x	
Hippuris vulgaris	common mare's-tail				x			
Lycopodium selago	fir clubmoss						x	
Lycopodium sp.	clubmoss sp.						x	
Matricaria ambigua	false mayweed				x	x		*Tripleurospermum maritimum* ssp. *phaeocephalum*
Melandrium apetalum	apetalous catchfly	x	x				x	*Silene uralensis* ssp. *uralensis*

Attachment D Compiled Plant Species List (1979 to 2009)

Scientific Name	Common Name	Pre-1987 [(a)]	1987-1989[(b)]	1990[(c)]	1991[(d)]	1991[(e)]	2008 - 09	Other Names
Parnassia palustris	marsh grass of Parnasus						x	
Parrya arctica	Arctic false wallflower	x	x					
Parrya nudicaulis	nakedstem wallflower	x	x					
Parrya sp.	parrya sp.	x	x					
Pedicularis arctica	arctic lousewort		x				x	*Pedicularis langsdorffii* ssp. *arctica*
Pedicularis capitata	few-flowered lousewort						x	
Pedicularis flammea	flame-coloured lousewort						x	
Pedicularis lanata	woolly lousewort		x				x	
Pedicularis lapponica	Lapland lousewort		x					
Pedicularis sudetica	sudetic lousewort		x	x	x	x	x	
Pedicularis sp.	lousewort sp.			x			x	
Pinguicula villosa	hairy butterwort						x	
Pinguicula vulgaris	common butterwort				x	x		
Polygonum viviparum	alpine bistort	x	x	x	x	x	x	
Potentilla hyparctica	Arctic cinquefoil		x					*Potentilla nana*
Potentilla palustris	purple marshlocks			x	x	x	x	*Comarum palustre*
Potentilla rubricaulis	Rocky Mountain cinquefoil				x	x		
Potentilla vahliana	Vahl's cinquefoil		x					
Potentilla sp.	cinquefoil sp.		x				x	
Pyrola grandiflora	large-flowered wintergreen		x	x	x	x	x	
Pyrola sp.	wintergreen sp.						x	
Ranunculus sabinei	Sabine buttercup	x	x					
Ranunculus sulphureus	sulphur buttercup	x	x					
Rubus chamaemorus	cloudberry						x	
Sagina intermedia	snow pearlwort	x	x					*Sagina nivalis*
Sausseria purpurea	sawwort						x	
Saussurea angustifolia	narrow-leaf sawwort			x	x	x	x	
Saxifraga aizoides	yellow mountain saxifrage			x				
Saxifraga caespitosa	tufted bulrush		x		x			
Saxifraga cernua	nodding saxifrage		x	x			x	
Saxifraga flagellaris	whiplash saxifrage		x					
Saxifraga foliolosa	leafy-stem saxifrage		x		x	x		
Saxifraga hieraciifolia	hawkweed-leaved saxifrage		x					
Saxifraga hirculus	yellow marsh saxifrage		x					
Saxifraga nivalis	alpine saxifrage		x					
Saxifraga oppositifolia	purple mountain saxifrage		x					
Saxifraga sp.	saxifrage sp.						x	
Saxifraga tenuis	Ottertail Pass saxifrage		x					
Saxifraga tricuspidata	three toothed saxifrage		x	x	x	x	x	
Sedum lanceolatum	spear-leaf stonecrop				x	x		
Silene acaulis	moss campion	x	x	x	x	x	x	
Stellaria longipes	long-stalk starwort	x	x	x	x	x	x	
Tofieldia coccinea	northern false asphodel						x	
Tofieldia pusilla	Scotch false asphodel				x	x	x	
Trisetum spicatum	spike trisetum	x	x				x	
Graminoids								
Agrostis sp.	bentgrass sp.						x	
Arctagrostis latifolia	wide-leaf polargrass	x	x	x	x	x	x	
Arctagrostis sp.	arcticgrass sp.						x	
Agropyron latiglume	Alaskan wheatgrass	x	x					*Elymus alaskanus* ssp. *latiglumis*
Alopecurus alpinus	boreal alopecurus	x	x					
Calamagrostis deschampsoides	circumpolar reedgrass						x	
Calamagrostis inexpansa	slimstem reedgrass						x	
Calamagrostis lapponica	Lapland reedgrass			x	x		x	*Calamagrostis lapponica* var. *nearctica*
Calamagrostis neglecta	slimstem reedgrass						x	*Calamagrostis neglecta*
Calamagrostis sp.	reedgrass sp.						x	
Carex aquatilis	water sedge		x	x	x	x	x	*Carex aquatilis* var. *stans*
Carex atrofusca	darkbrown sedge						x	
Carex bigelowii	Bigelow's sedge		x	x	x	x	x	
Carex capillaris	hair-like sedge				x	x		
Carex chordorrhiza	creeping sedge				x	x		
Carex glacialis	alpine sedge		x				x	
Carex gynocrates	northern bog sedge						x	
Carex holostoma	Arctic marsh sedge			x	x	x		
Carex membranacea	fragile sedge				x	x	x	
Carex misandra	short-leaved sedge		x				x	
Carex nardina	spike sedge				x	x		
Carex norvegica	Norway sedge				x	x		
Carex rariflora	loose-flower alpine sedge		x		x	x	x	
Carex rostrata	beaked sedge		x					
Carex rotundata	round sedge				x	x	x	
Carex rupestris	curly sedge				x	x	x	
Carex saxatilis	rock sedge			x	x	x	x	
Carex scirpoidea	northern single-spike sedge		x				x	
Carex sp.	sedge sp.						x	
Carex stans	tundra sedge		x					
Carex vaginata	sheathed sedge			x	x	x	x	
Carex williamsii	Williams' sedge				x	x		
Colpodium vahlianum	Vahl's alkaligrass	x	x					*Puccinellia vahliana*
Deschampsia caespitosa	tufted hairgrass						x	
Dupontia fisheri	Fisher's tundragrass	x	x					
Elymus arenarius ssp. *mollis*	American dunegrass				x	x		*Elymus mollis*
Eriophorum angustifolium	tall cottongrass		x	x	x	x	x	
Eriophorum russeolum	red cottongrass						x	
Eriophorum scheuchzeri	white cottongrass		x				x	
Eriophorum sp.	cottongrass sp.		x				x	

Attachment D Compiled Plant Species List (1979 to 2009)

Scientific Name	Common Name	Pre-1987 [(a)]	1987-1989[(b)]	1990[(c)]	1991[(d)]	1991[(e)]	2008 - 09	Other Names
Eriophorum vaginatum	tussock cottongrass		x		x	x	x	*Eriophorum vaginatum* ssp. *spissum*
Eriophorum triste	tall cottongrass		x					*Eriophorum angustifolium* ssp. *triste*
Festuca baffinensis	Baffin fescue	x	x					
Festuca brachyphylla	alpine fescue	x	x					
Festuca sp.	fescue sp.						x	
Graminoid sp.	grass sp.						x	
Hierochloe alpina	alpine sweetgrass	x	x	x	x	x	x	*Anthoxanthum monticola* ssp. *alpinum*
Juncaceace sp.	rush family		x					
Juncus albescens	northern white rush				x	x	x	
Juncus arcticus	Arctic rush						x	
Juncus biglumis	two-flowered rush		x					
Juncus castaneus	chestnut rush				x	x		
Kobresia myosuroides	Bellardi bog sedge				x	x	x	
Kobresia simpliciuscula	simple bog sedge						x	
Luzula confusa	northern woodrush		x	x	x	x	x	
Luzula nivalis	arctic woodrush		x	x				*Luzula arctica* ssp. *arctica*
Luzula sp.	woodrush sp.				x	x		
Luzula spicata	spiked woodrush				x	x		
Luzula wahlenbergii	Wahlenberg's woodrush		x		x	x	x	
Phippsia algida	icegrass	x	x					
Pleuropogon sabinei	false semaphoregrass	x	x					
Poa abbreviata	short bluegrass	x	x					
Poa alpigena	northern meadow grass	x	x					*Poa pratensis* ssp. *alpigena*
Poa alpina	alpine bluegrass						x	
Poa arctica	arctic bluegrass	x	x				x	
Poa glauca	glaucous bluegrass				x	x		
Poa sp.	bluegrass sp.	x	x				x	
Poaceae	grass family	x						
Puccinellia bruggemannii	Prince Patrick alkaligrass	x	x					
Scirpus caespitosus	tufted bulrush				x	x	x	*Trichophorum cespitosum*
Ferns and allies								
Dryopteris fragrans	fragrant woodfern						x	
Equisetum arvense	field horsetail			x		x		
Equisetum variegatum	variegated scouring-rush		x					
Lycopodium clavatum	running clubmoss				x	x		
Lycopodium selago	fir clubmoss	x	x	x	x	x		*Huperzia selago* var. *selago*
Lycopodium sp.	clubmoss sp.				x	x		
Woodsia ilvensis	rusty woodsia				x			
Bryophytes								
Aulacomnium sp.	aulacomnium moss sp.			x		x		
Aulacomnium turgidum	turgid aulacomnium moss		x			x		
Brophyta	unknown mosses	x					x	
Calliergon sarmentosum	sarmenthypnum moss					x		*Sarmenthypnum sarmentosum*
Calliergon sp.	watermoss					x		
Campylium stellatum	star campylium moss					x		
Cinclidium latifolium	wideleaf cinclidium moss					x		
Dicranum acutifolium	acute-leaf dicranum moss					x		
Dicranum elongatum	elongate dicranum moss		x			x		
Dicranum sp.	dicranum moss sp.			x		x		
Dicranum spadiceum	dicranum moss					x		
Grimmia affinis	grimmia dry rock moss					x		
Hylocomium splendens	step moss					x		
Limprichtia revolvens	limprichtia moss					x		
Loeskypnum badium	loeskypnum moss					x		*Sarmenthypnum sarmentosum*
Oncophorus wahlenbergii	Wahlenberg's oncophorus moss					x		
Physconia muscigena	frosted lichen					x		
Pleurozium schreberi	Schreber's big red stem moss					x		
Pleurozium sp.	big red stem moss			x				
Polytrichum sp.	haircap moss					x		
Polytrichum strictum	polytrichum moss					x		
Ptilidium ciliare	northern naugehyde liverwort					x		
Racomitrium lanuginosum	woolly fringe moss		x			x		
Racomitrium sp.	racomitrium moss			x				
Rhytidium rugosum	crumpled-leaf moss					x		
Sphagnum fuscum	rusty peat moss			x				
Sphagnum russowii	Russow's sphagnum					x		
Sphagnum sp.	sphagnum moss	x	x	x		x	x	
Sphagnum subsecundum	slender cow-horn bog-moss					x		
Fungus	variety						x	
Lichens								
Alectoria nigricans	gray witch's hair lichen					x	x	
Alectoria ochroleuca	green witch's hair lichen	x	x		x		x	
Allantoparmelia alpicola	allantoparmelia lichen					x		
Arctoparmelia centrifuga	sunburst lichen					x	x	
Arctoparmelia incurva	arctoparmelia lichen					x		
Arctoparmelia separata	bryocaulon lichen					x		
Bryocaulin divergens	lichen sp.						x	
Bryoria nitidula	bryoria lichen sp.						x	
Cetraria aculeata	lichen sp.						x	
Cetraria andrejevii	lichen sp.	x	x			x		*Arctocetraria andrejevii*
Cetraria cucullata	crinkled snow lichen				x		x	*Flavocetraria cucullata*
Cetraria delisei	snow bed Iceland lichen	x	x			x		
Cetraria islandica	Iceland moss	x	x	x			x	
Cetraria islandica ssp crispiformis	brown island moss					x		
Cetraria islandica ssp islandica	island cetraria lichen					x		
Cetraria laevigata	cetraria lichen				x			
Cetraria nigricans	cetraria lichen					x		

Attachment D Compiled Plant Species List (1979 to 2009)

Scientific Name	Common Name	Pre-1987 [a]	1987-1989[b]	1990[c]	1991[d]	1991[e]	2008 - 09	Other Names
Cetraria nivalis	ballroom dervish	x	x	x	x		x	*Flavocetraria nivalis*
Cetraria sp.	lichen sp.						x	
Cetraria tilesii	lichen sp.	x	x					*Vulpicida tilesii*
Cetrariella delisei	lichen sp.						x	
Cladina alpestris	star reindeer lichen	x	x			x	x	*Cladina stellaris*
Cladina mitis	lesser green reindeer lichen					x	x	
Cladina rangiferina	grey green reindeer lichen	x	x	x	x		x	
Cladina sp	reindeer lichen			x			x	
Cladonia amaurocraea	cup lichen	x	x		x			
Cladonia arbuscula	shrubby reindeer lichen					x		
Cladonia bellidiflora	toy soldiers lichen	x	x					
Cladonia chlorophaea	mealy pixie-cup	x	x					
Cladonia coccifera	cup lichen sp.	x	x			x		
Cladonia gracillis ssp. *gracilis*	cup lichen sp.					x		
Cladonia laevigata	cup lichen sp.					x		
Cladonia phyllophora	cup lichen sp.					x		
Cladonia pleurota	red-fruited pixie-cup					x		
Cladonia pocillum	cup lichen sp.					x		
Cladonia sp.	cup lichen sp.				x		x	
Cladonia stricta	cup lichen sp.					x		
Cladonia uncialis	cup lichen sp.					x		
Cladonia verticillata	cup lichen sp.	x	x					*Cladonia cervicornis* ssp. *verticillata*
Collema ceraniscum	jelly lichen					x		
Comicularia divergens	bryocaulon lichen	x	x					*Bryocaulon divergens*
Comicularia sp	lichen sp.			x				
Dactylina arctica	glove lichen	x	x		x		x	
Dactylina sp	dactylina lichen				x			
Icmadophila ericetorum	peppermint drop lichen					x		
Lecanora rupicola	rim lichen					x		
Lecidea auriculata	lecidea lichen					x		
Lecidea lapicida	lecidea lichen					x		
Lichen sp.	lichen sp.						x	
Nephroma arcticum	Arctic kidney lichen						x	
Ochrolechia frigida	cold crabseye lichen					x		
Ochrolechia sp.	crabseye lichen					x		
Ophioparma lapponica	feckle pelt lichen						x	
Parmelia omphalodes ssp. *omphalodes*	shield lichen					x		
Peltigera aphthosa	latex pelt, freckle pelt					x		
Peltigera rufescens	felt lichen					x		
Peltigera sp.	pelt lichen				x		x	
Pertusaria coriacea	leathery pore lichen	x	x			x		
Pertusaria dactylina	white finger lichen	x	x			x		
Pertusaria panyrga	pore lichen					x		
Porpidia flavicunda	porpidia lichen					x		*Porpidia flavocaerulescens*
Porpidia thomsonii	Thomson's porpidia lichen					x		
Pseudephebe pubescens	blackcurly lichen						x	
Rhizocarpon badioatrum	map lichen sp.					x		
Rhizocarpon eupetraeoides	map lichen sp.					x		
Rhizocarpon geminatum	map lichen sp.					x		
Rhizocarpon geographicum	world map lichen					x		
Rhizocarpon grande	big map lichen					x		
Rhizocarpen sp.	map lichen sp.						x	
Rock crustose lichen sp.	Rock crustose lichen sp.	x	x				x	
Siphula sp.	whitefingers lichen	x	x					
Solorina bispora	chocolate chip lichen					x		
Solorina crocea	chocolate chip lichen	x	x					
Sphaerophorus globosus	globe ball lichen	x	x		x		x	
Spilonema revertens	spilonema lichen		x					
Stereocaulon albicans	mealy lichen	x	x					*Leprocaulon albicans*
Stereocaulon alpinum	alpine snow lichen					x		
Stereocaulon rivulorum	snow lichen				x			
Stereocaulon sp.	foam lichens			x		x	x	
Thamnolia sp.	whiteworm lichen sp.			x	x			
Thamnolia subuliformis	whiteworm lichen sp.						x	
Thamnolia vermicularis	whiteworm lichen sp.	x	x			x	x	
Toninia sp.	bruised lichen					x		
Tortella tortuosa	tortured tortella moss					x		
Umbilicaria proboscidea	navel lichen sp.					x		
Umbilicaria sp.	navel lichen sp.					x	x	
Umbilicaria torrefacta	navel lichen sp.					x		
Verrucaria nigrescens	wart lichen sp.					x		
Verrucaria nigrescens var laeviascula	wart lichen sp.					x		
Xanthoria elegans	elegant orange wall lichen					x		

Note that 1979 plant species list may not be species observed in the field, but instead may be list of typical species in vegetation groups (includes observation of felt-leaf willow)
(a) Beak 1987b. Summary of plant species compiled from existing studies of the area (pre 1987) and during that study
(b) Wickware 1989. Summary of plant species compiled from existing studies of area (pre 1989) and during that study
(c) Geomatics International 1990. Plants noted on the study site (Sissons area only)
(d) Geomatics International 1991. Preliminary results of species found in the study area. Lichens were preliminary pending confirmation
(e) Geomatics International 1991. List of raw species from data sheets - identification not confirmed

Attachment E List of Plant Species Observed in Ecological Land Classification Units 2008/09

File: VSBR/Attachment E ELC and Plant Species

Attachment E List o List of Plant Species Observed in Ecological Land Classification Units 2008/09

ELC Unit	Plant Species	Wet Graminoid	Graminoid Tundra	Graminoid/ Shrub Tundra	Shrub Tundra	Shrub/ Heath Tundra	Heath Tundra	Heath Upland	Heath Upland/ Rock Complex	Lichen Tundra	Gravel	Rock Association
Graminoide	*Agrostis* sp.				√		√					
	Arctagrostis latifolia	√	√	√	√	√	√	√	√	√		√
	Arctagrostis sp.		√					√				
	Calamagrostis deschampsoides						√	√	√			
	Calamagrostis inexpansa				√							
	Calamagrostis lappinoca	√		√	√	√	√	√	√			√
	Calamagrostis neglecta				√	√	√					√
	Calamagrostis sp.	√	√	√	√	√	√	√	√			√
	Carex aquatilis	√	√	√	√	√	√	√		√		
	Carex atrofusca	√	√									
	Carex bigelowii		√				√					
	Carex glacialis							√				
	Carex gynocrates	√										
	Carex membranacea	√	√									
	Carex misandra	√	√					√				
	Carex rariflora	√	√									
	Carex rotundata	√	√	√	√		√	√				
	Carex rupestris		√									
	Carex saxatilis	√										
	Carex scirpoidea		√	√	√		√	√				
	Carex sp.	√	√	√	√	√	√	√	√		√	√
	Carex vaginata		√		√		√					
	Deschampsia caespitosa				√							
	Eriophorum angustifolium	√	√	√	√	√	√	√	√			√
	Eriophorum russeolum	√	√	√			√		√			
	Eriophorum scheuchzeri	√	√	√	√		√	√	√			
	Eriophorum sp.	√	√	√			√					
	Eriophorum vaginatum	√	√	√	√	√	√	√		√		
	Festuca sp.										√	
	Graminoid sp.	√	√	√	√	√	√	√	√	√	√	√
	Hierochloe alpina	√	√	√	√	√	√	√	√	√	√	√
	Juncus albescens					√						
	Juncus arcticus				√							
	Kobresia myosuroides		√									
	Kobresia simpliciuscula	√	√		√							
	Luzula confusa		√				√	√	√	√	√	
	Luzula wahlenbergii	√										
	Poa alpina					√	√					
	Poa arctica		√		√		√	√			√	
	Poa sp.	√	√	√	√	√	√	√	√		√	
	Trichophorum caespitosum	√	√					√				
Erect Shrub	*Betula glandulosa*	√	√	√	√	√	√	√	√	√		√
	Salix alexensis	√	√	√	√			√	√	√		
	Salix lanata	√	√	√	√		√	√				
	Salix planifolia	√	√	√	√	√	√	√	√			√
	Salix sp.	√	√	√	√	√	√	√	√	√	√	√
Ericaceous Shrub	*Arctostaphylos rubra*		√	√			√	√	√			√
	Arctostaphylos sp.	√	√	√	√	√	√	√	√	√		√
	Orthilia secunda				√		√					
	Vaccinium uliginosum	√	√	√	√	√	√	√	√	√	√	√
Evergreen Ericaceous Shrub	*Andromeda polifolia*	√	√	√	√	√	√	√	√			
	Cassiope tetragona	√	√	√	√	√	√	√	√	√	√	√
	Ledum decumbens	√	√	√	√	√	√	√	√	√	√	√
	Loiseleuria procumbens									√		
	Rhododendron lapponicum	√	√		√		√	√	√	√		
	Vaccinium vitis-idaea	√	√	√	√	√	√	√	√	√		√
Evergreen Prostrate Shrub	*Diapensia lappinoca*			√			√			√		
	Empetrum nigrum	√	√	√	√	√	√	√	√	√	√	√
Prostrate Shrub	*Salix arctica*	√	√	√	√		√	√				
	Salix arctophila	√	√	√	√	√	√	√	√			√
	Salix herbacea	√					√	√				
	Salix reticulata	√	√	√	√	√	√	√	√	√		√
	Salix sp. *(prostate)*	√	√		√	√	√	√				
Moss	*Moss* sp.	√	√	√	√	√	√	√	√	√	√	√
	Sphagnum Moss	√	√	√	√	√	√	√	√			√
Fern	*Dryopteris fragrans*								√		√	√
Forb	*Armeria maritima*	√	√		√		√	√				√
	Arnica alpina				√	√						
	Astragalus alpinus		√		√		√					
	Astragalus sp.							√				
	Cardamine pratensis		√		√	√	√		√			
	Castilleja elegans		√		√	√	√	√				
	Cerastium alpinum				√	√						
	Cerastium alpinum					√						
	Chamerion latifolium		√		√		√	√				√
	Draba glabella							√	√			
	Dryas integrifolia	√	√	√	√	√	√	√	√	√		√
	Epilobium latifolium		√	√			√		√			√
	Erigeron sp.						√					
	Forb sp.		√		√							
	Hedysarum alpinum		√		√	√	√	√	√			
	Hedysarum sp.		√						√			
	Lycopodium selago	√		√		√	√					
	Lycopodium sp.	√		√			√		√			√
	Melandrium apetalum											√
	Oxyria digyna		√									
	Oxytropis arctobia		√	√	√	√	√	√	√			√
	Oxytropis bellii							√				
	Oxytropis maydelliana		√	√		√	√	√	√			√
	Oxytropis sp.	√	√	√			√	√	√			
	Papaver hultenii		√				√					
	Parnassia palustris	√			√							
	Pedicularis arctica	√	√	√	√	√	√		√			
	Pedicularis capitata			√		√						
	Pedicularis flammea		√		√							
	Pedicularis lanata	√										
	Pedicularis sp.	√	√		√		√					
	Pedicularis sudetica		√	√				√				
	Pinguicula villosa		√			√						
	Polygonum viviparum	√	√	√	√		√	√	√			√
	Potentilla palustris	√		√	√			√				
	Potentilla sp.		√									√

Attachment E List o List of Plant Species Observed in Ecological Land Classification Units 2008/09

ELC Unit	Plant Species	Wet Graminoid	Graminoid Tundra	Graminoid/ Shrub Tundra	Shrub Tundra	Shrub/ Heath Tundra	Heath Tundra	Heath Upland	Heath Upland/ Rock Complex	Lichen Tundra	Gravel	Rock Association
	Pyrola grandiflora					√	√					
	Pyrola sp.				√	√	√					
	Rubus chamaemorus	√	√	√			√	√		√		
	Sausseria purpurens	√	√	√	√	√	√	√				
	Saussurea angustifolia	√	√	√	√	√	√	√	√			√
	Saxifraga cernua		√									
	Saxifraga sp.	√				√	√					√
	Saxifraga tricuspidata				√	√		√	√		√	√
	Silene acaulis	√	√	√	√	√	√	√	√		√	√
	Stellaria longipes					√	√		√			
	Tofielda pusilla	√	√	√		√	√		√			
	Tofieldia coccinea						√					
	Tofieldia pusilla		√		√			√				
	Trisetum spicatum								√			
Fungi	Fungi	√	√	√	√	√	√	√	√			
Lichen	*Alectoria nigricans*		√			√	√	√	√	√		√
	Alectoria ochroleuca		√	√	√	√	√	√	√	√	√	√
	Arctoparmelia centrifuga	√	√	√	√		√		√			√
	Bryocaulin divergens		√			√	√	√	√			√
	Bryoria nitidula		√		√	√	√	√	√	√	√	√
	Cetraria aculeata	√						√				
	Cetraria cucullata	√	√	√	√	√	√	√	√	√	√	√
	Cetraria islandica	√	√	√	√	√	√	√	√	√		
	Cetraria nivalis	√	√	√	√	√	√	√	√	√	√	√
	Cetraria sp.	√	√	√	√	√	√	√	√			
	Cetrariella delisei		√									
	Cladina mitis	√	√		√	√	√	√	√	√		√
	Cladina rangiferina	√	√		√	√	√	√	√	√		√
	Cladina sp.	√	√	√	√	√	√	√	√	√		
	Cladina stellaris							√	√	√		
	Cladonia sp.	√	√	√	√	√	√	√	√	√	√	
	Crustose lichens					√	√	√	√			√
	Dactylina arctica	√	√	√	√	√	√	√	√	√		√
	Lichen sp.	√	√	√	√	√	√	√	√	√	√	√
	Nephroma arcticum											√
	Ophioparma lapponica								√			
	Peltigera s p.								√			
	Pseudephebe pubescens								√			
	Rhizocarpen sp.	√	√		√		√	√	√			√
	Sphaerophorus globosus		√				√	√				
	Sphaerophorus globosus							√				
	Stereocaulon sp.		√		√	√	√	√	√	√	√	√
	Thamnolia subuliformis	√	√	√	√	√	√	√	√			√
	Thamnolia vermicularis		√	√	√	√	√	√	√	√	√	
	Umbellicaria		√		√		√	√	√			√
	Umbilicaria sp.								√		√	√
# of Plots		**42**	**46**	**21**	**42**	**19**	**66**	**47**	**55**	**12**	**5**	**19**
Average # Spp/Plot		**12.0**	**23.2**	**15.6**	**15.9**	**20.3**	**19.3**	**18.3**	**15.5**	**17.7**	**10.8**	**13.3**
Total Number - >10%		**31**	**50**	**22**	**29**	**20**	**33**	**36**	**28**	**17**	**3**	**11**
Total Number		**75**	**99**	**64**	**83**	**69**	**96**	**86**	**75**	**37**	**25**	**55**

Highlighted cells depict species that have over 10% cover in at least one sample plot

Plot size = 20 x 20 m

Attachment F Plant Tissue Raw Chemistry Data

File: VSBR/Attachment F Plant Chemistry

Attachment F Raw Chemistry Data, Plant Tissue 2007 (Mine LSA)

Parameters	Units	8/28/2007 SIS1L (LICHEN)	8/28/2007 SIS1WI (WILLOW)	8/28/2007 SIS1BI (BOG BIRCH)	8/28/2007 SIS1BB (BLUEBERRY VEG)	8/28/2007 SIS1BY (BLUEBERRIES)	8/28/2007 SIS1CA (CAREX)	8/28/2007 SIS2L (LICHEN)	8/28/2007 SIS2WI (WILLOW)	8/28/2007 SIS2BI (BOG BIRCH)	8/28/2007 SIS2BB (BLUEBERRY VEG)	8/28/2007 SIS2BY (BLUEBERRIES)	8/28/2007 SIS2CA (CAREX)
Mercury	ug/g	0.06	<0.05	<0.05	<0.05	<0.05	<0.05	0.07	<0.05	<0.05	<0.05	<0.05	<0.05
Aluminum	ug/g	440	8.6	34	86	16	38	380	16	11	100	63	14
Antimony	ug/g	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Arsenic	ug/g	0.20	<0.05	<0.05	<0.05	<0.05	<0.05	0.08	<0.05	<0.05	<0.05	<0.05	<0.05
Barium	ug/g	52	91	88	58	13	69	49	79	69	110	18	52
Beryllium	ug/g	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Boron	ug/g	3	15	12	9	16	15	3	14	9	11	60	8
Cadmium	ug/g	0.11	1.7	0.08	0.58	0.19	0.03	0.08	2.1	0.20	0.52	0.19	0.03
Chromium	ug/g	0.6	<0.5	<0.5	<0.5	0.6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Cobalt	ug/g	0.13	0.97	0.23	0.49	0.04	0.17	0.30	0.39	0.44	0.22	0.06	0.02
Copper	ug/g	2.3	7.6	4.9	6.3	4.3	1.9	2.2	6.7	4.4	6.7	4.9	4.4
Iron	ug/g	310	25	33	34	17	300	250	22	23	31	16	91
Lead	ug/g	2.5	0.06	0.20	0.16	<0.01	0.11	0.53	0.05	0.04	0.09	0.04	0.03
Manganese	ug/g	240	400	130	880	140	160	160	350	300	900	310	150
Molybdenum	ug/g	0.2	<0.1	<0.1	0.2	0.3	3.5	<0.1	<0.1	<0.1	<0.1	<0.1	1.2
Nickel	ug/g	0.94	1.0	1.2	4.1	1.2	0.52	0.99	0.57	1.7	3.4	1.9	0.24
Selenium	ug/g	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Silver	ug/g	0.03	<0.01	0.03	0.01	<0.01	<0.01	0.13	<0.01	<0.01	<0.01	<0.01	0.02
Strontium	ug/g	8.0	29	13	7.2	2.5	22	6.7	20	5.0	9.0	2.4	8.1
Thallium	ug/g	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Tin	ug/g	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Titanium	ug/g	11	0.30	1.1	0.54	0.07	0.45	5	0.31	0.35	0.76	0.33	0.25
Uranium	ug/g	0.33	<0.01	0.01	<0.01	<0.01	0.24	0.02	<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium	ug/g	0.8	<0.1	<0.1	<0.1	<0.1	<0.1	0.4	<0.1	<0.1	<0.1	<0.1	<0.1
Zinc	ug/g	26	120	120	39	21	20	60	290	56	51	21	49
Moisture	%	58.41	56.16	50.66	52.73	88.10	64.28	56.81	55.95	51.22	48.25	88.63	64.12
Lead-210	Bq/g	0.29	0.090	0.14	0.16	0.003	0.072	0.26	0.088	0.11	0.10	0.005	0.069
Polonium-210	Bq/g	0.31	0.088	0.13	0.10	0.0036	0.058	0.15	0.060	0.071	0.080	0.002	0.042
Radium-226	Bq/g	0.0059	0.0022	0.0025	0.0042	0.004	0.052	0.0024	0.0012	0.0027	0.0044	0.001	0.0020
Thorium-230	Bq/g	0.0031	<0.0006	0.0006	0.0006	<0.0004	0.0020	<0.0005	<0.0006	0.0005	0.0005	<0.001	<0.0008
Thorium-232	Bq/g	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

ND = No data

Attachment F Raw C

Parameters	Units	8/27/2007 SIS3L (LICHEN)	8/27/2007 SIS3WI (WILLOW)	8/27/2007 SIS3BI (BOG BIRCH)	8/27/2007 SIS3BB (BLUEBERRY VEG)	8/27/2007 SIS3BY (BLUEBERRIES)	8/27/2007 SIS3CA (CAREX)	8/27/2007 KIG1L (LICHEN)	8/27/2007 KIG1BI (BOG BIRCH)	8/27/2007 KIG1WI (WILLOW)	8/27/2007 KIG1BY (BLUEBERRIES)	8/27/2007 KIG1BB (BLUEBERRY VEG)	8/30/2007 KIG1CA (CAREX)
Mercury	ug/g	0.08	<0.05	<0.05	<0.05	<0.05	<0.05	0.09	<0.05	<0.05	<0.05	<0.05	<0.05
Aluminum	ug/g	130	16	32	48	12	3.4	220	25	13	6.5	44	10
Antimony	ug/g	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Arsenic	ug/g	0.06	<0.05	<0.05	<0.05	<0.05	<0.05	0.08	<0.05	<0.05	<0.05	<0.05	<0.05
Barium	ug/g	28	70	68	57	20	35	97	140	160	21	55	97
Beryllium	ug/g	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Boron	ug/g	2	21	9	15	14	5	2	10	15	15	9	9
Cadmium	ug/g	0.13	1.6	0.18	0.43	0.18	0.06	0.28	0.35	5	0.31	0.80	0.02
Chromium	ug/g	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Cobalt	ug/g	0.11	1.0	0.53	0.36	0.04	0.07	0.26	0.35	0.53	0.02	0.06	0.10
Copper	ug/g	2.6	6.0	5.0	7.8	7.0	3.6	1.7	4.9	12	3.1	9.1	2.8
Iron	ug/g	78	30	26	35	13	16	100	23	33	12	37	120
Lead	ug/g	0.30	0.07	0.11	0.05	0.01	0.02	1.0	0.09	0.20	0.01	0.06	0.03
Manganese	ug/g	370	430	410	1300	290	390	310	560	390	220	640	560
Molybdenum	ug/g	<0.1	<0.1	<0.1	<0.1	0.2	0.2	<0.1	<0.1	<0.1	<0.1	<0.1	1.7
Nickel	ug/g	0.69	1.1	2.2	2.1	1.0	1.2	0.81	2.4	1.4	1.9	1.2	0.27
Selenium	ug/g	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Silver	ug/g	<0.01	<0.01	<0.01	0.04	<0.01	0.02	<0.01	<0.01	0.05	<0.01	<0.01	<0.01
Strontium	ug/g	6.4	26	8.2	7.3	3.4	5.0	24	13	46	4.8	8.2	20
Thallium	ug/g	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Tin	ug/g	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.07	<0.05	<0.05	<0.05	<0.05	<0.05
Titanium	ug/g	3.2	0.36	0.71	0.76	0.17	0.11	5	0.79	0.33	0.06	0.64	0.24
Uranium	ug/g	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium	ug/g	0.2	<0.1	<0.1	<0.1	<0.1	<0.1	0.2	<0.1	<0.1	<0.1	<0.1	<0.1
Zinc	ug/g	29	130	100	32	19	22	44	150	380	25	70	100
Moisture	%	54.34	55.73	50.72	51.33	89.42	68.19	67.89	52.78	58.63	87.10	55.43	68.22
Lead-210	Bq/g	0.32	0.079	0.12	0.11	<0.002	0.054	0.50	0.086	0.076	0.002	0.078	0.058
Polonium-210	Bq/g	0.29	0.064	0.11	0.087	0.002	0.038	0.38	0.085	0.066	0.0041	0.058	0.037
Radium-226	Bq/g	0.0034	0.0021	0.0050	0.0046	0.0005	0.012	0.014	0.0055	0.014	0.0006	0.0039	0.0036
Thorium-230	Bq/g	0.0004	<0.0006	0.0008	<0.0005	<0.001	<0.0007	0.0008	<0.0004	0.001	<0.0004	0.0005	<0.0009
Thorium-232	Bq/g	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

ND = No data

Attachment F Raw C

Parameters	Units	8/27/2007 KIG2L (LICHEN)	8/27/2007 KIG2BI (BOG BIRCH)	8/27/2007 KIG2WI (WILLOW)	8/27/2007 KIG2BY (BLUEBERRIES)	8/27/2007 KIG2BB (BLUEBERRY VEG)	8/29/2007 KIG2CA (CAREX)	8/27/2007 KIG3L (LICHEN)	8/27/2007 KIG3BI (BOG BIRCH)	8/27/2007 KIG3WI (WILLOW)	8/27/2007 KIG3BB (BLUEBERRIES)	8/27/2007 KIG3BY (BLUEBERRY VEG)	8/30/2007 KIG3CA (CAREX)
Mercury	ug/g	0.10	<0.05	<0.05	<0.05	<0.05	<0.05	0.08	<0.05	<0.05	<0.05	<0.05	<0.05
Aluminum	ug/g	140	36	15	6.6	28	8.6	170	24	21	26	36	27
Antimony	ug/g	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Arsenic	ug/g	0.12	<0.05	<0.05	<0.05	<0.05	<0.05	0.12	<0.05	0.13	<0.05	<0.05	<0.05
Barium	ug/g	23	110	87	27	57	88	73	94	110	26	59	87
Beryllium	ug/g	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	0.02
Boron	ug/g	2	11	15	29	9	8	3	10	19	25	11	9
Cadmium	ug/g	0.10	0.14	4.1	0.36	0.59	0.08	0.22	0.10	3.1	0.16	0.57	0.02
Chromium	ug/g	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	0.6	0.6
Cobalt	ug/g	0.04	0.06	0.66	0.02	0.06	0.04	0.15	0.35	0.89	0.06	0.05	0.05
Copper	ug/g	1.2	4.3	4.4	4.9	9.1	3.4	3.0	5.9	7.3	4.0	9.6	3.5
Iron	ug/g	83	33	23	15	22	32	140	24	28	30	23	110
Lead	ug/g	0.37	0.21	0.11	<0.01	0.06	0.04	0.71	0.11	0.19	0.05	0.08	0.06
Manganese	ug/g	60	100	300	230	480	390	220	140	430	150	640	40
Molybdenum	ug/g	<0.1	<0.1	<0.1	0.1	<0.1	0.6	0.9	0.2	0.5	1.5	0.6	4.8
Nickel	ug/g	0.21	0.83	0.60	1.4	2.1	0.43	0.73	1.7	1.7	1.6	2.9	0.44
Selenium	ug/g	0.06	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Silver	ug/g	0.03	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	0.01	<0.01	<0.01	<0.01	0.09
Strontium	ug/g	6.4	16	35	5.1	11	15	25	15	47	7.2	12	14
Thallium	ug/g	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Tin	ug/g	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.06	<0.05	<0.05	<0.05	<0.05
Titanium	ug/g	4.5	1.4	0.49	0.10	0.37	0.30	10	2.8	49	0.79	14	2.7
Uranium	ug/g	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium	ug/g	0.2	<0.1	<0.1	<0.1	<0.1	<0.1	0.5	<0.1	1.8	<0.1	0.3	<0.1
Zinc	ug/g	25	120	120	23	49	50	35	170	300	20	70	31
Moisture	%	62.91	51.84	56.93	89.31	49.92	59.93	65.21	51.98	57.64	88.91	52.08	70.67
Lead-210	Bq/g	0.41	0.12	0.095	<0.002	0.12	0.014	0.58	0.16	0.11	0.011	0.057	0.007
Polonium-210	Bq/g	0.40	0.10	0.10	0.003	0.11	0.017	0.47	0.13	0.12	0.009	0.045	0.012
Radium-226	Bq/g	0.016	0.0019	0.0070	<0.0005	0.0056	0.0076	0.006	0.0055	0.0028	0.002	0.0023	0.0019
Thorium-230	Bq/g	0.001	0.001	0.001	<0.001	0.0006	<0.0005	0.002	0.002	0.0007	0.001	<0.0004	<0.0007
Thorium-232	Bq/g	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

ND = No data

Attachment F Raw Chemistry Data, Plant Tissue 2008

Parameters	Units	AREVA-KIGGAVIK-KIG3 SITE#1	AREVA-KIGGAVIK-KIG3 SITE#2	AREVA-KIGGAVIK-KIG3 SITE#3	AREVA-KIGGAVIK-KIG3 SITE#4	AREVA-KIGGAVIK-KIG3 SITE#5	AREVA-KIGGAVIK-KIG3 SITE#1-5 COMPOSITE	AREVA-KIGGAVIK-SIS3 SITE#1	AREVA-KIGGAVIK-SIS3 SITE#2	AREVA-KIGGAVIK-SIS3 SITE#3	AREVA-KIGGAVIK-SIS3 SITE#4	AREVA-KIGGAVIK-SIS3 SITE#5	AREVA-KIGGAVIK-SIS3 SITE#1-5 COMPOSITE	AREVA-KIGGAVIK-KIG4 SITE#1
		Berries	Berries	Berries	Berries	Berries	Berries	Berries	Berries	Berries	Berries	Berries	Berries	Berries
Aluminum	ug/g	2.7	3	2.8	2.4	2.2	ND	4	<2.0	3	5.1	<2.0	ND	4
Antimony	ug/g	<0.010	<0.010	<0.010	<0.010	<0.010	ND	<0.010	<0.010	<0.010	<0.010	<0.010	ND	<0.010
Arsenic	ug/g	<0.010	<0.010	<0.010	<0.010	<0.010	ND	<0.010	<0.010	<0.010	<0.010	<0.010	ND	<0.010
Barium	ug/g	2.33	2.51	3.49	2.64	1.81	ND	0.859	0.813	1.33	1.47	0.815	ND	1.71
Beryllium	ug/g	<0.10	<0.10	<0.10	<0.10	<0.10	ND	<0.10	<0.10	<0.10	<0.10	<0.10	ND	<0.10
Cadmium	ug/g	0.0206	<0.0050	0.0224	0.0151	0.0133	ND	<0.0050	<0.0050	0.0056	<0.0050	<0.0050	ND	<0.0050
Chromium	ug/g	0.11	0.11	0.3	<0.10	<0.10	ND	<0.10	3.45	<0.10	0.11	<0.10	ND	0.74
Cobalt	ug/g	<0.020	<0.020	<0.020	<0.020	<0.020	ND	<0.020	0.047	<0.020	<0.020	<0.020	ND	<0.020
Copper	ug/g	0.655	0.669	0.659	0.863	0.751	ND	0.769	1.02	0.883	0.639	0.774	ND	0.73
Lead	ug/g	<0.020	<0.020	<0.020	<0.020	<0.020	ND	<0.020	<0.020	<0.020	<0.020	<0.020	ND	<0.020
Manganese	ug/g	20.1	14	25.4	45.8	18.1	ND	6.07	8.88	15.9	20.6	10	ND	27.1
Mercury	ug/g	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	ND	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	ND	<0.0010
Molybdenum	ug/g	0.138	0.024	0.08	0.025	0.223	ND	0.022	0.187	0.014	0.03	<0.010	ND	0.051
Nickel	ug/g	0.24	0.18	0.39	0.2	0.13	ND	0.1	1.96	0.11	<0.10	0.14	ND	0.5
Selenium	ug/g	<0.20	<0.20	<0.20	<0.20	<0.20	ND	<0.20	<0.20	<0.20	<0.20	<0.20	ND	<0.20
Strontium	ug/g	0.709	0.62	0.892	0.636	0.601	ND	0.179	0.226	0.283	0.235	0.239	ND	0.529
Thallium	ug/g	<0.010	<0.010	<0.010	<0.010	<0.010	ND	<0.010	<0.010	<0.010	<0.010	<0.010	ND	<0.010
Tin	ug/g	0.084	0.069	0.103	0.083	0.082	ND	0.117	0.184	0.147	0.2	0.136	ND	0.09
Uranium	ug/g	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	ND	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	ND	0.0031
Vanadium	ug/g	<0.10	<0.10	<0.10	<0.10	<0.10	ND	<0.10	<0.10	<0.10	<0.10	<0.10	ND	<0.10
Zinc	ug/g	31.2	6.67	32.3	7.23	24.3	ND	7.27	20.6	26.5	1.75	2.26	ND	8.17
Bismuth	ug/g	<0.030	<0.030	<0.030	<0.030	<0.030	ND	<0.030	<0.030	<0.030	<0.030	<0.030	ND	<0.030
Calcium	ug/g	323	149	359	253	305	ND	99.1	227	278	142	88.6	ND	177
Lithium	ug/g	<0.10	<0.10	<0.10	<0.10	<0.10	ND	<0.10	<0.10	<0.10	<0.10	<0.10	ND	<0.10
Magnesium	ug/g	75.2	80.5	81.8	93.8	77.2	ND	51.2	72.9	64.9	86.5	67.2	ND	76.8
Moisture	%	89.4	86.6	89.8	87.1	87.6	87.49	87.5	86.8	86.4	85.1	86.1	86.44	87.9
Lead-210	Bq/g	ND	ND	ND	ND	ND	0.004	ND	ND	ND	ND	ND	0.013	ND
Polonium-210	Bq/g	ND	ND	ND	ND	ND	0.0034	ND	ND	ND	ND	ND	0.013	ND
Radium-226	Bq/g	ND	ND	ND	ND	ND	0.002	ND	ND	ND	ND	ND	<0.0009	ND
Thorium-230	Bq/g	ND	ND	ND	ND	ND	<0.005	ND	ND	ND	ND	ND	<0.005	ND
Thorium-232	Bq/g	ND	ND	ND	ND	ND	<0.005	ND	ND	ND	ND	ND	<0.005	ND

ND = No data

Attachment F Raw C

Parameters	Units	AREVA-KIGGAVIK-KIG4 SITE#2	AREVA-KIGGAVIK-KIG4 SITE#3	AREVA-KIGGAVIK-KIG4 SITE#4	AREVA-KIGGAVIK-KIG4 SITE#5	AREVA-KIGGAVIK-KIG4 SITE#1-5 COMPOSITE	AREVA-KIGGAVIK-KIG2 SITE#1	AREVA-KIGGAVIK-KIG2 SITE#2	AREVA-KIGGAVIK-KIG2 SITE#3	AREVA-KIGGAVIK-KIG2 SITE#4	AREVA-KIGGAVIK-KIG2 SITE#5	AREVA-KIGGAVIK-KIG2 SITE#1-5 COMPOSITE	AREVA-KIGGAVIK-KIG1 SITE#1	AREVA-KIGGAVIK-KIG1 SITE#2	AREVA-KIGGAVIK-KIG1 SITE#3
		Berries	Berries	Berries	Berries	Berries	Berries	Berries	Berries	Berries	Berries	Berries	Berries	Berries	Berries
Aluminum	ug/g	2.3	75.2	2.4	2.3	ND	3.2	2.2	2.6	2	3.1	ND	3.5	3.5	5.4
Antimony	ug/g	<0.010	<0.010	<0.010	<0.010	ND	<0.010	<0.010	<0.010	<0.010	<0.010	ND	<0.010	<0.010	<0.010
Arsenic	ug/g	<0.010	0.026	<0.010	<0.010	ND	<0.010	<0.010	<0.010	<0.010	<0.010	ND	<0.010	<0.010	<0.010
Barium	ug/g	1.45	8.31	1.33	1.09	ND	2.88	1.72	2.69	2.23	3.04	ND	1.8	3.52	2.06
Beryllium	ug/g	<0.10	<0.10	<0.10	<0.10	ND	<0.10	<0.10	<0.10	<0.10	<0.10	ND	<0.10	<0.10	<0.10
Cadmium	ug/g	0.0152	<0.0050	<0.0050	<0.0050	ND	<0.0050	<0.0050	0.0323	<0.0050	0.0215	ND	<0.0050	0.0455	<0.0050
Chromium	ug/g	<0.10	0.44	0.45	0.8	ND	0.72	2.82	<0.10	1.32	<0.10	ND	0.88	<0.10	<0.10
Cobalt	ug/g	<0.020	0.054	<0.020	<0.020	ND	<0.020	0.041	<0.020	<0.020	<0.020	ND	<0.020	<0.020	<0.020
Copper	ug/g	0.662	0.649	0.611	0.705	ND	0.662	0.712	0.621	0.701	0.59	ND	0.73	0.728	0.682
Lead	ug/g	<0.020	0.033	<0.020	<0.020	ND	<0.020	<0.020	<0.020	<0.020	<0.020	ND	<0.020	<0.020	<0.020
Manganese	ug/g	21.3	13.1	35.3	21.1	ND	27.7	18.9	20.5	29.4	15	ND	31.8	24.1	20.4
Mercury	ug/g	<0.0010	<0.0010	<0.0010	<0.0010	ND	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	ND	<0.0010	<0.0010	<0.0010
Molybdenum	ug/g	0.035	0.074	0.058	0.055	ND	0.058	0.166	0.013	0.077	0.03	ND	0.057	<0.010	<0.010
Nickel	ug/g	0.16	0.31	0.37	0.48	ND	0.49	1.68	0.14	0.77	0.17	ND	0.56	0.3	0.12
Selenium	ug/g	<0.20	<0.20	<0.20	<0.20	ND	<0.20	<0.20	<0.20	<0.20	<0.20	ND	<0.20	<0.20	<0.20
Strontium	ug/g	0.485	0.384	0.285	0.452	ND	0.653	0.313	0.746	0.649	0.757	ND	0.425	0.937	0.449
Thallium	ug/g	<0.010	<0.010	<0.010	<0.010	ND	<0.010	<0.010	<0.010	<0.010	<0.010	ND	<0.010	<0.010	<0.010
Tin	ug/g	0.09	0.053	0.112	0.068	ND	0.106	0.065	0.172	0.147	0.155	ND	0.062	0.19	0.1
Uranium	ug/g	<0.0020	0.0036	<0.0020	0.0059	ND	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	ND	<0.0020	<0.0020	<0.0020
Vanadium	ug/g	<0.10	<0.10	<0.10	<0.10	ND	<0.10	<0.10	<0.10	<0.10	<0.10	ND	<0.10	<0.10	<0.10
Zinc	ug/g	28.3	14.5	2.74	22.8	ND	16.6	1.31	9.78	1.63	28.8	ND	4.47	22.8	1.5
Bismuth	ug/g	<0.030	<0.030	<0.030	<0.030	ND	<0.030	<0.030	<0.030	<0.030	<0.030	ND	<0.030	<0.030	<0.030
Calcium	ug/g	345	164	167	239	ND	366	182	266	230	329	ND	180	378	145
Lithium	ug/g	<0.10	<0.10	<0.10	<0.10	ND	<0.10	<0.10	<0.10	<0.10	<0.10	ND	<0.10	<0.10	<0.10
Magnesium	ug/g	88.1	84.1	69.4	82.4	ND	90.8	82.9	85.4	107	66.7	ND	76	91	73.8
Moisture	%	87.8	87	88.4	84.7	87.15	87	86.6	88.2	86.2	87.5	87.29	86.8	88.3	87.7
Lead-210	Bq/g	ND	ND	ND	ND	0.004	ND	ND	ND	ND	ND	0.008	ND	ND	ND
Polonium-210	Bq/g	ND	ND	ND	ND	0.004	ND	ND	ND	ND	ND	0.008	ND	ND	ND
Radium-226	Bq/g	ND	ND	ND	ND	0.001	ND	ND	ND	ND	ND	<0.001	ND	ND	ND
Thorium-230	Bq/g	ND	ND	ND	ND	<0.005	ND	ND	ND	ND	ND	<0.005	ND	ND	ND
Thorium-232	Bq/g	ND	ND	ND	ND	<0.005	ND	ND	ND	ND	ND	<0.005	ND	ND	ND

ND = No data

Attachment F Raw C

Parameters	Units	AREVA-KIGGAVIK-KIG1 SITE#4	AREVA-KIGGAVIK-KIG1 SITE#5	AREVA-KIGGAVIK-KIG1 SITE#1-5 COMPOSITE	AREVA-KIGGAVIK-KIG5 SITE#1	AREVA-KIGGAVIK-KIG5 SITE#5	AREVA-KIGGAVIK-KIG5 SITE#1,5 COMPOSITE	AREVA-KIGGAVIK-SIS5 SITE#1	AREVA-KIGGAVIK-SIS5 SITE#3	AREVA-KIGGAVIK-SIS5 SITE#4	AREVA-KIGGAVIK-SIS5 SITE#5	AREVA-KIGGAVIK-SIS5 SITE#1,3,4,5 COMPOSITE	AREVA-KIGGAVIK-SIS1 SITE#1	AREVA-KIGGAVIK-SIS1 SITE#2
		Berries	Berries	Berries	Berries	Berries	Berries	Berries	Berries	Berries	Berries	Berries	Berries	Berries
Aluminum	ug/g	3.6	3.5	ND	3.8	4.2	ND	4.2	2.7	3.6	2.2	ND	3.1	2.3
Antimony	ug/g	<0.010	<0.010	ND	<0.010	<0.010	ND	<0.010	<0.010	<0.010	<0.010	ND	<0.010	<0.010
Arsenic	ug/g	<0.010	<0.010	ND	<0.010	<0.010	ND	<0.010	<0.010	<0.010	<0.010	ND	<0.010	<0.010
Barium	ug/g	2.31	2.27	ND	2.64	2.09	ND	1.73	1.6	1.48	1.75	ND	2.05	1.85
Beryllium	ug/g	<0.10	<0.10	ND	<0.10	<0.10	ND	<0.10	<0.10	<0.10	<0.10	ND	<0.10	<0.10
Cadmium	ug/g	0.0183	0.0182	ND	<0.0050	<0.0050	ND	<0.0050	<0.0050	<0.0050	<0.0050	ND	0.0207	0.0199
Chromium	ug/g	<0.10	<0.10	ND	0.16	<0.10	ND	<0.10	4.94	<0.10	1.4	ND	<0.10	<0.10
Cobalt	ug/g	<0.020	<0.020	ND	<0.020	<0.020	ND	<0.020	0.067	<0.020	0.021	ND	<0.020	<0.020
Copper	ug/g	0.685	0.67	ND	0.734	0.537	ND	0.563	0.737	0.747	0.655	ND	0.646	0.726
Lead	ug/g	<0.020	<0.020	ND	<0.020	<0.020	ND	<0.020	<0.020	<0.020	<0.020	ND	<0.020	<0.020
Manganese	ug/g	23.6	24.1	ND	40.1	65.6	ND	65.7	28.8	13.3	38.5	ND	18.6	22
Mercury	ug/g	<0.0010	<0.0010	ND	<0.0010	<0.0010	ND	<0.0010	<0.0010	<0.0010	<0.0010	ND	<0.0010	<0.0010
Molybdenum	ug/g	0.012	0.013	ND	0.032	0.013	ND	0.015	0.308	0.015	0.089	ND	0.041	0.043
Nickel	ug/g	0.12	0.12	ND	0.18	<0.10	ND	<0.10	2.99	<0.10	0.86	ND	0.12	0.32
Selenium	ug/g	<0.20	<0.20	ND	<0.20	<0.20	ND	<0.20	<0.20	<0.20	<0.20	ND	<0.20	<0.20
Strontium	ug/g	0.644	0.623	ND	0.326	0.358	ND	0.338	0.326	0.28	0.37	ND	0.459	0.399
Thallium	ug/g	<0.010	<0.010	ND	<0.010	<0.010	ND	<0.010	<0.010	<0.010	<0.010	ND	<0.010	<0.010
Tin	ug/g	0.138	0.141	ND	0.093	0.174	ND	<0.050	0.063	0.129	0.063	ND	0.112	0.073
Uranium	ug/g	<0.0020	<0.0020	ND	<0.0020	<0.0020	ND	<0.0020	<0.0020	<0.0020	<0.0020	ND	<0.0020	<0.0020
Vanadium	ug/g	<0.10	<0.10	ND	<0.10	<0.10	ND	<0.10	<0.10	<0.10	<0.10	ND	<0.10	<0.10
Zinc	ug/g	24.7	24.2	ND	1.91	1.79	ND	1.61	2.86	1.58	1.69	ND	18	34.2
Bismuth	ug/g	<0.030	<0.030	ND	<0.030	<0.030	ND	<0.030	<0.030	<0.030	<0.030	ND	<0.030	<0.030
Calcium	ug/g	327	323	ND	293	227	ND	207	185	149	203	ND	307	403
Lithium	ug/g	<0.10	<0.10	ND	<0.10	<0.10	ND	<0.10	<0.10	<0.10	<0.10	ND	<0.10	<0.10
Magnesium	ug/g	79.9	79.9	ND	95.7	106	ND	108	80.4	86.1	97.1	ND	79.3	81.6
Moisture	%	85.6	86.6	87.02	85.4	85.8	85.69	85.8	86.4	85	89	85.69	88.2	85.6
Lead-210	Bq/g	ND	ND	0.014	ND	ND	0.009	ND	ND	ND	ND	0.01	ND	ND
Polonium-210	Bq/g	ND	ND	0.014	ND	ND	0.007	ND	ND	ND	ND	0.0082	ND	ND
Radium-226	Bq/g	ND	ND	0.001	ND	ND	0.001	ND	ND	ND	ND	<0.0009	ND	ND
Thorium-230	Bq/g	ND	ND	<0.005	ND	ND	<0.005	ND	ND	ND	ND	<0.005	ND	ND
Thorium-232	Bq/g	ND	ND	<0.005	ND	ND	<0.005	ND	ND	ND	ND	<0.005	ND	ND

ND = No data

Attachment F Raw C

Parameters	Units	AREVA-KIGGAVIK-SIS1 SITE#3	AREVA-KIGGAVIK-SIS1 SITE#4	AREVA-KIGGAVIK-SIS1 SITE#5	AREVA-KIGGAVIK-SIS1 SITE#1-5 COMPOSITE	AREVA-KIGGAVIK-SIS2 SITE#1	AREVA-KIGGAVIK-SIS2 SITE#3	AREVA-KIGGAVIK-SIS2 SITE#5	AREVA-KIGGAVIK-SIS2 SITE#1,3,5 COMPOSITE	AREVA-KIGGAVIK-SIS4 SITE#1	AREVA-KIGGAVIK-SIS4 SITE#2	AREVA-KIGGAVIK-SIS4 SITE#3	AREVA-KIGGAVIK-SIS4 SITE#4	AREVA-KIGGAVIK-SIS4 SITE#5
		Berries	Berries	Berries	Berries	Berries	Berries	Berries	Berries	Berries	Berries	Berries	Berries	Berries
Aluminum	ug/g	4.4	4.3	2.3	ND	25.6	3.5	<2.0	ND	2.1	3.7	2.7	3.3	4.7
Antimony	ug/g	<0.010	<0.010	<0.010	ND	<0.010	<0.010	<0.010	ND	<0.010	<0.010	<0.010	<0.010	<0.010
Arsenic	ug/g	<0.010	<0.010	<0.010	ND	<0.010	<0.010	<0.010	ND	<0.010	<0.010	<0.010	<0.010	<0.010
Barium	ug/g	1.92	1.73	2.31	ND	1.85	1.8	1.42	ND	2.39	2.65	2.67	2.5	2.03
Beryllium	ug/g	<0.10	<0.10	<0.10	ND	<0.10	<0.10	<0.10	ND	<0.10	<0.10	<0.10	<0.10	<0.10
Cadmium	ug/g	0.0156	0.0071	0.0239	ND	0.0055	0.0121	<0.0050	ND	0.0176	0.0085	0.0164	0.0153	0.0174
Chromium	ug/g	<0.10	<0.10	<0.10	ND	0.23	<0.10	0.47	ND	0.29	<0.10	<0.10	<0.10	<0.10
Cobalt	ug/g	<0.020	<0.020	<0.020	ND	<0.020	<0.020	<0.020	ND	<0.020	<0.020	<0.020	<0.020	<0.020
Copper	ug/g	0.675	0.743	0.594	ND	0.719	0.644	0.565	ND	0.665	0.706	0.643	0.647	0.652
Lead	ug/g	<0.020	<0.020	<0.020	ND	<0.020	<0.020	<0.020	ND	<0.020	<0.020	<0.020	<0.020	<0.020
Manganese	ug/g	26.1	20.1	27.5	ND	23	35.4	27.5	ND	24.9	43.7	32.5	29.1	26.5
Mercury	ug/g	<0.0010	<0.0010	<0.0010	ND	<0.0010	<0.0010	<0.0010	ND	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Molybdenum	ug/g	0.04	0.055	0.05	ND	0.021	<0.010	0.037	ND	0.053	0.034	0.025	0.021	0.026
Nickel	ug/g	0.15	<0.10	0.13	ND	0.27	0.16	0.37	ND	0.28	0.12	0.17	0.11	0.18
Selenium	ug/g	<0.20	<0.20	<0.20	ND	<0.20	<0.20	<0.20	ND	<0.20	<0.20	<0.20	<0.20	<0.20
Strontium	ug/g	0.417	0.367	0.516	ND	0.434	0.244	0.261	ND	0.482	0.543	0.487	0.519	0.433
Thallium	ug/g	<0.010	<0.010	<0.010	ND	<0.010	<0.010	<0.010	ND	<0.010	<0.010	<0.010	<0.010	<0.010
Tin	ug/g	0.207	0.164	0.103	ND	0.123	0.15	0.102	ND	0.128	0.336	0.215	0.13	0.193
Uranium	ug/g	<0.0020	<0.0020	<0.0020	ND	<0.0020	<0.0020	<0.0020	ND	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Vanadium	ug/g	<0.10	<0.10	<0.10	ND	<0.10	<0.10	<0.10	ND	<0.10	<0.10	<0.10	<0.10	<0.10
Zinc	ug/g	15.8	15.4	33.8	ND	29.3	20.3	22.1	ND	29.5	35.6	40.4	32	31.8
Bismuth	ug/g	<0.030	<0.030	<0.030	ND	<0.030	<0.030	<0.030	ND	<0.030	<0.030	<0.030	<0.030	<0.030
Calcium	ug/g	281	306	413	ND	264	294	248	ND	409	460	479	430	410
Lithium	ug/g	<0.10	<0.10	<0.10	ND	<0.10	<0.10	<0.10	ND	<0.10	<0.10	<0.10	<0.10	<0.10
Magnesium	ug/g	81	85.7	86.1	ND	97	80.9	74	ND	88.8	93.7	89.3	89.4	94.2
Moisture	%	87.2	86.4	88.5	88.06	86.5	87.8	87.9	86.87	87.9	86.7	88.4	87.3	87.8
Lead-210	Bq/g	ND	ND	ND	0.013	ND	ND	ND	0.007	ND	ND	ND	ND	ND
Polonium-210	Bq/g	ND	ND	ND	0.012	ND	ND	ND	0.008	ND	ND	ND	ND	ND
Radium-226	Bq/g	ND	ND	ND	0.001	ND	ND	ND	<0.001	ND	ND	ND	ND	ND
Thorium-230	Bq/g	ND	ND	ND	<0.005	ND	ND	ND	<0.005	ND	ND	ND	ND	ND
Thorium-232	Bq/g	ND	ND	ND	<0.005	ND	ND	ND	<0.005	ND	ND	ND	ND	ND

ND = No data

Attachment F Raw C

Parameters	Units	AREVA-KIGGAVIK-SIS4 SITE#1-5 COMPOSITE	AREVA KIGGAVIK SIS5 #1 SEDGE	AREVA KIGGAVIK SIS5 #1 LICHEN	AREVA KIGGAVIK SIS5 #2 SEDGE	AREVA KIGGAVIK SIS5 #2 LICHEN	AREVA KIGGAVIK SIS5 #3 SEDGE	AREVA KIGGAVIK SIS5 #3 LICHEN	AREVA KIGGAVIK SIS5 #4 SEDGE	AREVA KIGGAVIK SIS5 #4 LICHEN	AREVA KIGGAVIK SIS5 #5 SEDGE	AREVA KIGGAVIK SIS5 #5 LICHEN	AREVA KIGGAVIK SIS5-1,2 SEDGE COMPOSITE
		Berries	Sedge	Lichen	Sedge	Lichen	Sedge	Lichen	Sedge	Lichen	Sedge	Lichen	Sedge Comp
Aluminum	ug/g	ND	53.4	58.6	16.2	281	42.7	462	54.2	96.6	298	73.1	ND
Antimony	ug/g	ND	<0.020	<0.030	<0.020	<0.030	<0.020	<0.030	<0.020	<0.040	<0.020	<0.040	ND
Arsenic	ug/g	ND	0.03	0.032	<0.020	0.095	0.028	0.162	0.033	0.065	0.443	0.067	ND
Barium	ug/g	ND	10.8	35.4	19.1	21.6	12.4	51.4	22.6	42.4	30.7	23.8	ND
Beryllium	ug/g	ND	<0.20	<0.30	<0.20	<0.30	<0.20	<0.30	<0.20	<0.40	<0.20	<0.40	ND
Cadmium	ug/g	ND	0.027	0.036	0.017	0.106	0.064	0.063	0.034	0.084	0.054	0.102	ND
Chromium	ug/g	ND	0.35	3.39	0.21	0.9	0.3	17.9	0.77	1.29	6.33	0.85	ND
Cobalt	ug/g	ND	0.054	0.112	<0.040	0.085	0.042	0.417	0.066	0.161	0.86	<0.080	ND
Copper	ug/g	ND	0.602	1.87	1.18	1.18	0.755	4.65	1.37	1.85	2.24	1.66	ND
Lead	ug/g	ND	0.188	0.209	0.103	0.432	0.198	0.541	0.237	0.702	0.447	0.365	ND
Manganese	ug/g	ND	109	652	135	77.4	108	296	215	260	293	220	ND
Mercury	ug/g	ND	0.0122	0.0086	0.0037	0.023	0.0129	0.0242	0.0133	0.0174	0.013	0.0082	ND
Molybdenum	ug/g	ND	0.026	0.339	0.236	0.038	<0.020	0.521	0.17	0.068	0.183	0.067	ND
Nickel	ug/g	ND	0.31	2.18	0.28	0.99	0.42	9.09	0.83	1.04	3.78	0.87	ND
Selenium	ug/g	ND	<0.40	<0.60	<0.40	<0.60	<0.40	<0.60	<0.40	<0.80	<0.40	<0.80	ND
Strontium	ug/g	ND	2.83	6.83	5.27	11.1	3.86	13.3	5.06	10.4	8.49	11.3	ND
Thallium	ug/g	ND	<0.020	<0.030	<0.020	<0.030	<0.020	<0.030	<0.020	<0.040	<0.020	<0.040	ND
Tin	ug/g	ND	<0.10	<0.15	<0.10	<0.15	<0.10	<0.15	<0.10	<0.20	<0.10	<0.20	ND
Uranium	ug/g	ND	0.0056	0.0066	<0.0040	0.0341	0.009	0.0571	0.01	0.0122	0.0476	0.009	ND
Vanadium	ug/g	ND	<0.20	<0.30	<0.20	<0.30	<0.20	0.74	<0.20	<0.40	0.83	<0.40	ND
Zinc	ug/g	ND	10.5	23.2	17.4	16	16.8	29	18.4	37	13.9	23.9	ND
Bismuth	ug/g	ND	<0.060	<0.090	<0.060	<0.090	<0.060	<0.090	<0.060	<0.12	<0.060	<0.12	ND
Calcium	ug/g	ND	830	2070	1040	2790	1310	2340	1300	2780	1550	3320	ND
Lithium	ug/g	ND	<0.20	<0.30	<0.20	<0.30	<0.20	0.34	<0.20	<0.40	0.27	<0.40	ND
Magnesium	ug/g	ND	183	448	304	451	202	650	300	535	380	526	ND
Moisture	%	88.01	44.5	51.9	53.3	44.3	55.7	56	58.5	47.7	55.4	61.1	ND
Lead-210	Bq/g	0.008	ND	ND	ND	ND	0.2	ND	0.36	0.54	0.32	ND	0.32
Polonium-210	Bq/g	0.0068	ND	ND	ND	ND	0.16	ND	0.24	0.36	0.15	ND	0.24
Radium-226	Bq/g	0.001	ND	ND	ND	ND	0.003	ND	0.002	0.004	0.004	ND	0.003
Thorium-230	Bq/g	<0.004	ND	ND	ND	ND	<0.005	ND	<0.005	<0.005	<0.005	ND	<0.005
Thorium-232	Bq/g	<0.004	ND	ND	ND	ND	<0.005	ND	<0.005	<0.005	<0.005	ND	<0.005

ND = No data

Attachment F Raw C

Parameters	Units	AREVA-KIGGAVIK SIS5 #1,3 LICHEN COMPOSITE	AREVA-KIGGAVIK SIS5 #2,5 LICHEN COMPOSITE	AREVA KIGGAVIK SIS4 #1 SEDGE	AREVA KIGGAVIK SIS4 #1 LICHEN	AREVA KIGGAVIK SIS4 #2 SEDGE	AREVA KIGGAVIK SIS4 #2 LICHEN	AREVA KIGGAVIK SIS4 #3 SEDGE	AREVA KIGGAVIK SIS4 #3 LICHEN	AREVA KIGGAVIK SIS4 #4 SEDGE	AREVA KIGGAVIK SIS4 #4 LICHEN	AREVA KIGGAVIK SIS4 #5 SEDGE	AREVA KIGGAVIK SIS4 #5 LICHEN
		Lichen Comp	Lichen Comp	Sedge	Lichen	Sedge	Lichen	Sedge	Lichen	Sedge	Lichen	Sedge	Lichen
Aluminum	ug/g	ND	ND	39.8	170	40.7	403	72.4	74.1	41.6	57.1	41.2	48.4
Antimony	ug/g	ND	ND	<0.020	<0.040	<0.020	<0.040	<0.030	<0.040	<0.020	<0.040	<0.020	<0.040
Arsenic	ug/g	ND	ND	0.034	0.073	0.028	0.199	0.034	0.06	0.031	<0.040	0.027	<0.040
Barium	ug/g	ND	ND	19.9	58.5	17.4	65	45.1	37.3	24.8	58.4	12.5	35.1
Beryllium	ug/g	ND	ND	<0.20	<0.40	<0.20	<0.40	<0.30	<0.40	<0.20	<0.40	<0.20	<0.40
Cadmium	ug/g	ND	ND	0.077	0.097	0.086	0.065	0.063	0.147	0.076	0.067	0.06	0.05
Chromium	ug/g	ND	ND	0.37	2.06	0.26	1.59	0.62	0.48	0.37	0.6	0.37	1.12
Cobalt	ug/g	ND	ND	0.044	0.329	0.047	1.4	0.245	0.084	<0.040	0.105	0.044	<0.080
Copper	ug/g	ND	ND	0.923	4.71	1.22	5.17	3.38	1.77	1.05	3.45	0.784	2.42
Lead	ug/g	ND	ND	0.308	0.402	0.293	0.483	0.403	0.63	0.378	0.377	0.239	0.321
Manganese	ug/g	ND	ND	113	271	159	434	340	244	77.9	292	102	409
Mercury	ug/g	ND	ND	0.0134	0.0041	0.0145	0.0043	0.006	0.0043	0.0148	0.008	0.0182	0.007
Molybdenum	ug/g	ND	ND	0.039	0.454	0.053	0.473	0.441	0.115	0.04	0.615	0.035	0.376
Nickel	ug/g	ND	ND	0.35	2.45	0.34	2.76	1.02	0.51	0.32	1.09	0.31	0.92
Selenium	ug/g	ND	ND	<0.40	<0.80	<0.40	<0.80	<0.60	<0.80	<0.40	<0.80	<0.40	<0.80
Strontium	ug/g	ND	ND	6.52	13.6	6.45	13.4	9.07	12.4	9.4	12.7	4.72	7.17
Thallium	ug/g	ND	ND	<0.020	<0.040	<0.020	<0.040	<0.030	<0.040	<0.020	<0.040	<0.020	<0.040
Tin	ug/g	ND	ND	<0.10	<0.20	<0.10	<0.20	<0.15	<0.20	<0.10	<0.20	<0.10	<0.20
Uranium	ug/g	ND	ND	0.0065	0.0333	0.0048	0.0654	0.0191	0.0096	0.0056	0.0081	0.0063	0.031
Vanadium	ug/g	ND	ND	<0.20	<0.40	<0.20	0.49	<0.30	<0.40	<0.20	<0.40	<0.20	<0.40
Zinc	ug/g	ND	ND	18.1	28.3	19.1	23.8	23.1	33.5	15.5	36.1	16.5	19.9
Bismuth	ug/g	ND	ND	<0.060	<0.12	<0.060	<0.12	<0.090	<0.12	<0.060	<0.12	<0.060	<0.12
Calcium	ug/g	ND	ND	2400	3470	2370	2910	2140	4570	3900	3340	1520	2200
Lithium	ug/g	ND	ND	<0.20	<0.40	<0.20	<0.40	<0.30	<0.40	<0.20	<0.40	<0.20	<0.40
Magnesium	ug/g	ND	ND	342	856	363	753	600	576	349	787	294	653
Moisture	%	ND	ND	53.9	66.7	36.1	63.7	57.3	58.1	44.9	62.4	56.4	61
Lead-210	Bq/g	0.37	0.4	ND	ND	0.19	ND	ND	ND	0.46	ND	0.32	ND
Polonium-210	Bq/g	0.37	0.32	ND	ND	0.14	ND	ND	ND	0.26	ND	0.22	ND
Radium-226	Bq/g	0.002	0.002	ND	ND	0.008	ND	ND	ND	0.003	ND	0.003	ND
Thorium-230	Bq/g	<0.005	<0.005	ND	ND	0.02	ND	ND	ND	0.01	ND	<0.005	ND
Thorium-232	Bq/g	<0.005	<0.005	ND	ND	0.02	ND	ND	ND	<0.005	ND	<0.005	ND

ND = No data

Attachment F Raw C

Parameters	Units	AREVA KIGGAVIK SIS4-1,3 SEDGE COMPOSITE	AREVA-KIGGAVIK SIS4 #2,3 LICHEN COMPOSITE	AREVA-KIGGAVIK SIS4 #1,4,5 LICHEN COMPOSITE	AREVA KIGGAVIK SIS1 #1 SEDGE	AREVA KIGGAVIK SIS1 #1 LICHEN	AREVA KIGGAVIK SIS1 #2 SEDGE	AREVA KIGGAVIK SIS1 #2 LICHEN	AREVA KIGGAVIK SIS1 #3 SEDGE	AREVA KIGGAVIK SIS1 #3 LICHEN	AREVA KIGGAVIK SIS1 #4 SEDGE	AREVA KIGGAVIK SIS1 #4 LICHEN	AREVA KIGGAVIK SIS1 #5 SEDGE
		Sedge Comp	Lichen Comp	Lichen Comp	Sedge	Lichen	Sedge	Lichen	Sedge	Lichen	Sedge	Lichen	Sedge
Aluminum	ug/g	ND	ND	ND	13.5	42.3	94.8	16	60.4	85.1	53.3	60.8	29.2
Antimony	ug/g	ND	ND	ND	<0.020	<0.030	<0.030	<0.020	<0.030	<0.020	<0.020	<0.030	<0.020
Arsenic	ug/g	ND	ND	ND	<0.020	0.032	0.055	<0.020	0.05	0.074	0.029	0.047	<0.020
Barium	ug/g	ND	ND	ND	13.2	16.5	26.6	16.3	21.7	18.7	21.6	23.2	21.9
Beryllium	ug/g	ND	ND	ND	<0.20	<0.30	<0.30	<0.20	<0.30	<0.20	<0.20	<0.30	<0.20
Cadmium	ug/g	ND	ND	ND	0.012	0.067	0.11	0.019	0.092	0.025	0.057	0.073	0.037
Chromium	ug/g	ND	ND	ND	1.62	<0.30	0.65	<0.20	0.56	1.8	0.96	0.36	0.38
Cobalt	ug/g	ND	ND	ND	0.076	<0.060	0.077	0.097	0.129	0.423	0.228	0.063	0.221
Copper	ug/g	ND	ND	ND	3.18	0.911	1.37	2.56	1.38	2.88	2.38	1.11	1.91
Lead	ug/g	ND	ND	ND	0.055	0.299	0.531	0.104	0.412	0.214	0.253	0.453	0.094
Manganese	ug/g	ND	ND	ND	98.5	94.4	214	116	196	145	90.7	143	100
Mercury	ug/g	ND	ND	ND	0.0056	0.0244	0.0351	0.0064	0.0296	0.0072	0.0107	0.0348	0.0077
Molybdenum	ug/g	ND	ND	ND	0.122	0.077	0.092	0.255	0.156	0.453	1.01	0.126	0.386
Nickel	ug/g	ND	ND	ND	1.3	<0.30	0.52	0.45	0.53	1.86	1.04	0.34	0.76
Selenium	ug/g	ND	ND	ND	<0.40	<0.60	<0.60	<0.40	<0.60	<0.40	<0.40	<0.60	<0.40
Strontium	ug/g	ND	ND	ND	3.35	6.78	6.62	4.27	7.82	6.75	6.89	7.15	5.94
Thallium	ug/g	ND	ND	ND	<0.020	<0.030	<0.030	<0.020	<0.030	<0.020	<0.020	<0.030	<0.020
Tin	ug/g	ND	ND	ND	<0.10	<0.15	0.82	<0.10	<0.15	<0.10	<0.10	<0.15	<0.10
Uranium	ug/g	ND	ND	ND	<0.0040	0.0651	0.322	0.061	0.0704	0.0145	0.0383	0.0753	0.0147
Vanadium	ug/g	ND	ND	ND	<0.20	<0.30	<0.30	<0.20	<0.30	<0.20	<0.20	<0.30	<0.20
Zinc	ug/g	ND	ND	ND	11.3	15.6	23.7	12.3	23.7	13.6	11	23.5	9.21
Bismuth	ug/g	ND	ND	ND	<0.060	<0.090	<0.090	<0.060	<0.090	<0.060	<0.060	<0.090	<0.060
Calcium	ug/g	ND	ND	ND	876	2250	2490	933	2500	1490	1720	2480	1290
Lithium	ug/g	ND	ND	ND	<0.20	<0.30	<0.30	<0.20	<0.30	<0.20	<0.20	<0.30	<0.20
Magnesium	ug/g	ND	ND	ND	285	358	412	281	439	414	307	327	397
Moisture	%	ND	ND	ND	65.5	40.4	32.5	57.1	35	61.2	45.5	31.1	60.8
Lead-210	Bq/g	0.27	0.48	0.56	ND	ND	0.16	ND	ND	ND	ND	ND	ND
Polonium-210	Bq/g	0.23	0.47	0.43	ND	ND	0.12	ND	ND	ND	ND	ND	ND
Radium-226	Bq/g	0.001	0.002	0.002	ND	ND	0.008	ND	ND	ND	ND	ND	ND
Thorium-230	Bq/g	<0.005	0.006	<0.005	ND	ND	0.01	ND	ND	ND	ND	ND	ND
Thorium-232	Bq/g	<0.005	<0.005	<0.005	ND	ND	<0.005	ND	ND	ND	ND	ND	ND

ND = No data

Attachment F Raw C

Parameters	Units	AREVA KIGGAVIK SIS1 #5 LICHEN	AREVA KIGGAVIK SIS1-1,5 SEDGE COMPOSITE	AREVA-KIGGAVIK SIS1 #1,2,3 LICHEN COMPOSITE	AREVA KIGGAVIK SIS1-3,4 SEDGE COMPOSITE	AREVA-KIGGAVIK SIS1 #4,5 LICHEN COMPOSITE	AREVA KIGGAVIK K1G3 #1 SEDGE	AREVA KIGGAVIK K1G3 #1 LICHEN	AREVA KIGGAVIK K1G3 #2 SEDGE	AREVA KIGGAVIK K1G3 #2 LICHEN	AREVA KIGGAVIK K1G3 #3 SEDGE	AREVA KIGGAVIK K1G3 #3 LICHEN	AREVA KIGGAVIK K1G3 #4 SEDGE
		Lichen	Sedge Comp	Lichen Comp	Sedge Comp	Lichen Comp	Sedge	Lichen	Sedge	Lichen	Sedge	Lichen	Sedge
Aluminum	ug/g	55.6	ND	ND	ND	ND	60.1	501	191	43.1	16.6	96.5	68.6
Antimony	ug/g	<0.030	ND	ND	ND	ND	<0.040	<0.020	<0.040	<0.030	<0.020	<0.040	<0.030
Arsenic	ug/g	0.035	ND	ND	ND	ND	0.051	0.31	0.103	<0.030	<0.020	0.092	0.06
Barium	ug/g	22.8	ND	ND	ND	ND	50	75.4	84.8	38.1	41.3	59	50.2
Beryllium	ug/g	<0.30	ND	ND	ND	ND	<0.40	<0.20	<0.40	<0.30	<0.20	<0.40	<0.30
Cadmium	ug/g	0.086	ND	ND	ND	ND	0.171	0.084	0.075	0.021	0.042	0.121	0.129
Chromium	ug/g	0.37	ND	ND	ND	ND	<0.40	5.29	1.75	1.14	0.23	1.3	0.36
Cobalt	ug/g	0.067	ND	ND	ND	ND	<0.080	0.622	0.293	0.083	0.052	0.088	0.155
Copper	ug/g	1.25	ND	ND	ND	ND	2.05	6.19	1.23	1.32	1.49	1.85	1.87
Lead	ug/g	0.385	ND	ND	ND	ND	0.337	1.05	0.94	0.237	0.072	0.492	0.37
Manganese	ug/g	247	ND	ND	ND	ND	117	123	186	345	147	209	356
Mercury	ug/g	0.0332	ND	ND	ND	ND	0.0292	0.0154	0.0445	0.0191	0.006	0.0397	0.0395
Molybdenum	ug/g	0.136	ND	ND	ND	ND	0.907	3.41	0.293	0.646	1.84	0.413	0.128
Nickel	ug/g	0.36	ND	ND	ND	ND	0.7	4.34	1.31	0.82	0.54	1.23	0.78
Selenium	ug/g	<0.60	ND	ND	ND	ND	<0.80	<0.40	<0.80	<0.60	<0.40	<0.80	<0.60
Strontium	ug/g	6.82	ND	ND	ND	ND	25.1	13.5	16.5	7.77	7.78	16.2	17.8
Thallium	ug/g	<0.030	ND	ND	ND	ND	<0.040	<0.020	<0.040	<0.030	<0.020	<0.040	<0.030
Tin	ug/g	<0.15	ND	ND	ND	ND	<0.20	<0.10	<0.20	<0.15	<0.10	<0.20	<0.15
Uranium	ug/g	0.0424	ND	ND	ND	ND	0.0157	0.175	0.0277	0.0076	<0.0040	0.0258	0.0169
Vanadium	ug/g	<0.30	ND	ND	ND	ND	<0.40	1.16	<0.40	<0.30	<0.20	<0.40	<0.30
Zinc	ug/g	19.4	ND	ND	ND	ND	26.5	16.2	26.4	22.7	21.3	38.5	33
Bismuth	ug/g	<0.090	ND	ND	ND	ND	<0.12	<0.060	<0.12	<0.090	<0.060	<0.12	<0.090
Calcium	ug/g	2590	ND	ND	ND	ND	5960	1590	2340	1210	1080	2460	3030
Lithium	ug/g	<0.30	ND	ND	ND	ND	<0.40	0.41	<0.40	<0.30	<0.20	<0.40	<0.30
Magnesium	ug/g	407	ND	ND	ND	ND	740	607	529	477	360	460	522
Moisture	%	33.4	ND	ND	ND	ND	16.9	55.8	15.6	50.5	55.9	14.9	16.8
Lead-210	Bq/g	ND	0.2	0.47	0.25	0.41	0.25	ND	0.31	ND	ND	ND	0.32
Polonium-210	Bq/g	ND	0.12	0.38	0.13	0.38	0.23	ND	0.24	ND	ND	ND	0.29
Radium-226	Bq/g	ND	0.004	0.01	0.005	0.004	0.006	ND	0.004	ND	ND	ND	0.006
Thorium-230	Bq/g	ND	<0.004	0.006	0.006	<0.005	<0.005	ND	<0.005	ND	ND	ND	<0.005
Thorium-232	Bq/g	ND	<0.004	<0.005	<0.005	<0.005	<0.005	ND	<0.005	ND	ND	ND	<0.005

ND = No data

Attachment F Raw C

Parameters	Units	AREVA KIGGAVIK K1G3 #4 LICHEN	AREVA KIGGAVIK K1G3 #5 SEDGE	AREVA KIGGAVIK K1G3 #5 LICHEN	AREVA-KIGGAVIK KIG3 #1,2,4 LICHEN COMPOSITE	AREVA KIGGAVIK KIG3-3,5 SEDGE COMPOSITE	AREVA-KIGGAVIK KIG3 #3,5 LICHEN COMPOSITE	AREVA-KIGGAVIK SIS2-1 SEDGE	AREVA-KIGGAVIK SIS2-1 LICHEN	AREVA-KIGGAVIK SIS2-2 SEDGE	AREVA-KIGGAVIK SIS2-2 LICHEN	AREVA-KIGGAVIK SIS2-3 SEDGE	AREVA-KIGGAVIK SIS2-3 LICHEN
		Lichen	Sedge	Lichen	Lichen Comp	Sedge Comp	Lichen Comp	Sedge	Lichen	Sedge	Lichen	Sedge	Lichen
Aluminum	ug/g	27.2	18.7	76.6	ND	ND	ND	19.5	51.8	19.7	39.6	23	55.9
Antimony	ug/g	<0.020	<0.020	<0.040	ND	ND	ND	<0.020	<0.030	<0.020	<0.030	<0.020	<0.030
Arsenic	ug/g	0.032	<0.020	0.071	ND	ND	ND	<0.020	0.049	<0.020	0.041	0.031	0.048
Barium	ug/g	55.1	41	48.7	ND	ND	ND	19.5	34.8	24.9	26.5	16.3	42.4
Beryllium	ug/g	<0.20	<0.20	<0.40	ND	ND	ND	<0.20	<0.30	<0.20	<0.30	<0.20	<0.30
Cadmium	ug/g	0.03	0.035	0.105	ND	ND	ND	0.023	0.161	0.014	0.069	0.015	0.079
Chromium	ug/g	0.34	0.21	0.48	ND	ND	ND	0.68	0.34	<0.20	<0.30	<0.20	0.46
Cobalt	ug/g	0.252	<0.040	0.093	ND	ND	ND	0.068	0.162	<0.040	<0.060	0.07	0.118
Copper	ug/g	2.86	2.01	2.26	ND	ND	ND	1.46	1.65	1.83	0.702	1.7	1.66
Lead	ug/g	0.148	0.086	0.594	ND	ND	ND	0.056	0.303	0.057	0.258	<0.040	0.264
Manganese	ug/g	180	106	214	ND	ND	ND	209	353	68.7	27	91.5	271
Mercury	ug/g	0.0102	0.0073	0.0453	ND	ND	ND	0.005	0.0323	0.0059	0.019	0.0057	0.047
Molybdenum	ug/g	0.395	1.52	1.58	ND	ND	ND	0.09	<0.030	0.176	0.056	0.254	0.044
Nickel	ug/g	0.96	0.46	0.75	ND	ND	ND	0.56	0.77	0.57	<0.30	0.61	0.94
Selenium	ug/g	<0.40	<0.40	<0.80	ND	ND	ND	<0.40	<0.60	<0.40	<0.60	<0.40	<0.60
Strontium	ug/g	8.58	9.53	15.5	ND	ND	ND	1.99	4.59	4.54	9.58	2.5	7.99
Thallium	ug/g	<0.020	<0.020	<0.040	ND	ND	ND	<0.020	<0.030	<0.020	<0.030	<0.020	<0.030
Tin	ug/g	<0.10	<0.10	<0.20	ND	ND	ND	<0.10	<0.15	<0.10	<0.15	<0.10	<0.15
Uranium	ug/g	0.0141	<0.0040	0.0126	ND	ND	ND	<0.0040	<0.0060	<0.0040	<0.0060	0.0052	0.0065
Vanadium	ug/g	<0.20	<0.20	<0.40	ND	ND	ND	<0.20	<0.30	<0.20	<0.30	<0.20	<0.30
Zinc	ug/g	18.4	12	29.2	ND	ND	ND	11.5	36.1	10.7	13.3	11.7	33.1
Bismuth	ug/g	<0.060	<0.060	<0.12	ND	ND	ND	<0.060	<0.090	<0.060	<0.090	<0.060	<0.090
Calcium	ug/g	1080	1520	3260	ND	ND	ND	723	1840	1620	4430	857	4140
Lithium	ug/g	<0.20	<0.20	<0.40	ND	ND	ND	<0.20	<0.30	<0.20	<0.30	<0.20	<0.30
Magnesium	ug/g	334	353	455	ND	ND	ND	258	383	368	421	420	576
Moisture	%	56.7	50.3	16.7	ND	ND	ND	64.9	31.4	58.9	42.5	63.7	21
Lead-210	Bq/g	ND	ND	ND	0.47	0.24	0.45	ND	ND	ND	ND	ND	ND
Polonium-210	Bq/g	ND	ND	ND	0.45	0.21	0.39	ND	ND	ND	ND	ND	ND
Radium-226	Bq/g	ND	ND	ND	0.004	0.007	0.002	ND	ND	ND	ND	ND	ND
Thorium-230	Bq/g	ND	ND	ND	<0.005	<0.005	<0.005	ND	ND	ND	ND	ND	ND
Thorium-232	Bq/g	ND	ND	ND	<0.005	<0.005	<0.005	ND	ND	ND	ND	ND	ND

ND = No data

Attachment F Raw C

Parameters	Units	AREVA-KIGGAVIK SIS2-4 SEDGE	AREVA-KIGGAVIK SIS2-4 LICHEN	AREVA-KIGGAVIK SIS2-5 SEDGE	AREVA-KIGGAVIK SIS2-5 LICHEN	AREVA KIGGAVIK SIS2-2,3 SEDGE COMPOSITE	AREVA-KIGGAVIK SIS2-2,3 LICHEN COMPOSITE	AREVA KIGGAVIK SIS2-1,4,5 SEDGE COMPOSITE	AREVA-KIGGAVIK SIS2-1,5 LICHEN COMPOSITE	AREVA-KIGGAVIK SIS3-1 SEDGE	AREVA-KIGGAVIK SIS3-1 LICHEN	AREVA-KIGGAVIK SIS3-2 SEDGE	AREVA-KIGGAVIK SIS3-2 LICHEN
		Sedge	Lichen	Sedge	Lichen	Sedge Comp	Lichen Comp	Sedge Comp	Lichen Comp	Sedge	Lichen	Sedge	Lichen
Aluminum	ug/g	16	51.9	9.7	156	ND	ND	ND	ND	22.6	89.6	47.1	48.9
Antimony	ug/g	<0.020	<0.040	<0.020	<0.040	ND	ND	ND	ND	<0.020	<0.040	<0.020	<0.040
Arsenic	ug/g	<0.020	0.053	0.027	0.101	ND	ND	ND	ND	<0.020	0.102	0.06	0.052
Barium	ug/g	31.4	31.7	23.2	30.1	ND	ND	ND	ND	24.4	20.6	25.2	22.5
Beryllium	ug/g	<0.20	<0.40	<0.20	<0.40	ND	ND	ND	ND	<0.20	<0.40	<0.20	<0.40
Cadmium	ug/g	0.014	0.087	0.014	0.074	ND	ND	ND	ND	0.095	0.111	0.032	0.116
Chromium	ug/g	<0.20	0.41	<0.20	1.06	ND	ND	ND	ND	<0.20	0.45	0.26	<0.40
Cobalt	ug/g	<0.040	<0.080	0.528	0.134	ND	ND	ND	ND	<0.040	<0.080	0.052	<0.080
Copper	ug/g	1.71	0.955	1.41	1.61	ND	ND	ND	ND	1.97	1.54	2.57	1.13
Lead	ug/g	0.042	0.31	<0.040	0.448	ND	ND	ND	ND	0.091	0.375	0.104	0.347
Manganese	ug/g	62.3	35.6	453	233	ND	ND	ND	ND	104	91.7	97.6	57.1
Mercury	ug/g	0.005	0.0267	0.0056	0.0526	ND	ND	ND	ND	0.0111	0.0518	0.0069	0.0314
Molybdenum	ug/g	0.153	0.062	0.495	0.053	ND	ND	ND	ND	0.108	0.05	0.414	0.048
Nickel	ug/g	0.44	0.41	0.59	0.91	ND	ND	ND	ND	0.61	0.63	0.87	<0.40
Selenium	ug/g	<0.40	<0.80	<0.40	<0.80	ND	ND	ND	ND	<0.40	<0.80	<0.40	<0.80
Strontium	ug/g	5.31	11.8	3.34	7.93	ND	ND	ND	ND	7.75	8.5	5.4	10.2
Thallium	ug/g	<0.020	<0.040	<0.020	<0.040	ND	ND	ND	ND	<0.020	<0.040	<0.020	<0.040
Tin	ug/g	<0.10	<0.20	<0.10	<0.20	ND	ND	ND	ND	<0.10	<0.20	<0.10	<0.20
Uranium	ug/g	<0.0040	<0.0080	<0.0040	0.0155	ND	ND	ND	ND	<0.0040	0.0127	0.617	0.0098
Vanadium	ug/g	<0.20	<0.40	<0.20	<0.40	ND	ND	ND	ND	<0.20	<0.40	<0.20	<0.40
Zinc	ug/g	10.1	17.7	15.9	35.9	ND	ND	ND	ND	18.9	24.4	18.4	29.7
Bismuth	ug/g	<0.060	<0.12	<0.060	<0.12	ND	ND	ND	ND	<0.060	<0.12	<0.060	<0.12
Calcium	ug/g	1870	5380	936	2960	ND	ND	ND	ND	2570	3640	1880	4910
Lithium	ug/g	<0.20	<0.40	<0.20	<0.40	ND	ND	ND	ND	<0.20	<0.40	<0.20	<0.40
Magnesium	ug/g	370	516	392	480	ND	ND	ND	ND	495	524	428	476
Moisture	%	58.4	17.6	61.3	22.4	ND	ND	ND	ND	54.9	15.6	49.7	14.6
Lead-210	Bq/g	ND	0.38	ND	ND	0.095	0.4	0.12	0.35	ND	ND	ND	ND
Polonium-210	Bq/g	ND	0.38	ND	ND	0.086	0.38	0.11	0.29	ND	ND	ND	ND
Radium-226	Bq/g	ND	0.002	ND	ND	0.002	0.002	0.004	0.002	ND	ND	ND	ND
Thorium-230	Bq/g	ND	<0.005	ND	ND	0.006	<0.005	<0.004	<0.005	ND	ND	ND	ND
Thorium-232	Bq/g	ND	<0.005	ND	ND	<0.005	<0.005	<0.004	<0.005	ND	ND	ND	ND

ND = No data

Attachment F Raw C

Parameters	Units	AREVA-KIGGAVIK SIS3-3 SEDGE	AREVA-KIGGAVIK SIS3-3 LICHEN	AREVA-KIGGAVIK SIS3-4 SEDGE	AREVA-KIGGAVIK SIS3-4 LICHEN	AREVA-KIGGAVIK SIS3-5 SEDGE	AREVA-KIGGAVIK SIS3-5 LICHEN	AREVA-KIGGAVIK SIS3-1,3 LICHEN COMPOSITE	AREVA-KIGGAVIK SIS3-2,4 LICHEN COMPOSITE	AREVA KIGGAVIK SIS3-1,2,4,5 SEDGE COMPOSITE	AREVA-KIGGAVIK KIG1-1 SEDGE	AREVA-KIGGAVIK KIG1-1 LICHEN	AREVA-KIGGAVIK KIG1-2 SEDGE
		Sedge	Lichen	Sedge	Lichen	Sedge	Lichen	Lichen Comp	Lichen Comp	Sedge Comp	Sedge	Lichen	Sedge
Aluminum	ug/g	96.1	52.7	46	87.6	33.2	332	ND	ND	ND	27.8	65.5	27.8
Antimony	ug/g	<0.040	<0.040	<0.020	<0.040	<0.030	<0.040	ND	ND	ND	<0.020	<0.040	<0.020
Arsenic	ug/g	0.085	0.054	0.035	0.077	<0.030	0.189	ND	ND	ND	<0.020	0.058	0.021
Barium	ug/g	51.9	22.5	16.8	31.1	26.2	38.3	ND	ND	ND	46.2	41.7	41.7
Beryllium	ug/g	<0.40	<0.40	<0.20	<0.40	<0.30	<0.40	ND	ND	ND	<0.20	<0.40	<0.20
Cadmium	ug/g	0.073	0.098	0.017	0.073	0.058	0.129	ND	ND	ND	0.042	0.18	0.038
Chromium	ug/g	1.28	<0.40	2.05	0.73	<0.30	3.8	ND	ND	ND	<0.20	0.51	0.67
Cobalt	ug/g	0.272	<0.080	0.07	<0.080	<0.060	0.318	ND	ND	ND	0.075	<0.080	0.052
Copper	ug/g	4.27	1.25	2.24	1.52	2.41	1.83	ND	ND	ND	2.98	1.71	2.2
Lead	ug/g	0.193	0.41	0.094	0.545	0.121	1.66	ND	ND	ND	0.211	0.471	0.143
Manganese	ug/g	284	184	78.9	59.6	50.2	136	ND	ND	ND	105	256	113
Mercury	ug/g	0.0152	0.0353	0.0067	0.0485	0.0134	0.0776	ND	ND	ND	0.008	0.0295	0.0067
Molybdenum	ug/g	0.47	<0.040	0.167	0.115	0.159	0.085	ND	ND	ND	0.135	<0.040	0.384
Nickel	ug/g	2.56	0.59	1.21	0.6	0.65	2.32	ND	ND	ND	0.92	0.71	0.92
Selenium	ug/g	<0.80	<0.80	<0.40	<0.80	<0.60	<0.80	ND	ND	ND	<0.40	<0.80	<0.40
Strontium	ug/g	12	7.42	3.96	11.7	9.63	17.3	ND	ND	ND	8.69	11.3	9.42
Thallium	ug/g	<0.040	<0.040	<0.020	<0.040	<0.030	<0.040	ND	ND	ND	<0.020	<0.040	<0.020
Tin	ug/g	<0.20	<0.20	<0.10	<0.20	<0.15	<0.20	ND	ND	ND	<0.10	<0.20	<0.10
Uranium	ug/g	0.0377	0.0095	0.0053	0.0118	0.0144	0.034	ND	ND	ND	0.0114	0.008	0.0047
Vanadium	ug/g	<0.40	<0.40	<0.20	<0.40	<0.30	0.74	ND	ND	ND	<0.20	<0.40	<0.20
Zinc	ug/g	24	26.7	10.8	22.3	18.2	23.8	ND	ND	ND	21.3	38.6	11.9
Bismuth	ug/g	<0.12	<0.12	<0.060	<0.12	<0.090	<0.12	ND	ND	ND	<0.060	<0.12	<0.060
Calcium	ug/g	3320	3290	1170	4810	3000	3700	ND	ND	ND	1250	2780	1590
Lithium	ug/g	<0.40	<0.40	<0.20	<0.40	<0.30	<0.40	ND	ND	ND	<0.20	<0.40	<0.20
Magnesium	ug/g	696	442	357	487	586	530	ND	ND	ND	355	426	393
Moisture	%	27.4	15.4	61.2	14	42.2	13.9	ND	ND	ND	56.2	13.2	55.6
Lead-210	Bq/g	0.031	ND	ND	ND	ND	0.54	0.4	0.42	0.16	ND	ND	ND
Polonium-210	Bq/g	0.027	ND	ND	ND	ND	0.48	0.41	0.4	0.1	ND	ND	ND
Radium-226	Bq/g	0.007	ND	ND	ND	ND	0.005	0.004	0.003	0.003	ND	ND	ND
Thorium-230	Bq/g	0.01	ND	ND	ND	ND	<0.005	<0.005	<0.005	<0.005	ND	ND	ND
Thorium-232	Bq/g	0.01	ND	ND	ND	ND	<0.005	<0.005	<0.005	<0.005	ND	ND	ND

ND = No data

Attachment F Raw C

Parameters	Units	AREVA-KIGGAVIK KIG1-2 LICHEN	AREVA-KIGGAVIK KIG1-3 SEDGE	AREVA-KIGGAVIK KIG1-3 LICHEN	AREVA-KIGGAVIK KIG1-4 SEDGE	AREVA-KIGGAVIK KIG1-4 LICHEN	AREVA-KIGGAVIK KIG1-5 SEDGE	AREVA-KIGGAVIK KIG1-5 LICHEN	AREVA-KIGGAVIK KIG1-1,2 LICHEN COMPOSITE	AREVA KIGGAVIK KIG1-1,2,4 SEDGE COMPOSITE	AREVA KIGGAVIK KIG1-3,5 SEDGE COMPOSITE	AREVA-KIGGAVIK KIG1-3,5 LICHEN COMPOSITE	AREVA-KIGGAVIK KIG2-1 SEDGE
		Lichen	Sedge	Lichen	Sedge	Lichen	Sedge	Lichen	Lichen Comp	Sedge Comp	Sedge Comp	Lichen Comp	Sedge
Aluminum	ug/g	80.5	48.7	91.7	45.1	155	31.7	63.5	ND	ND	ND	ND	109
Antimony	ug/g	<0.040	<0.020	<0.040	<0.020	<0.040	<0.030	<0.040	ND	ND	ND	ND	<0.020
Arsenic	ug/g	0.065	0.044	0.066	0.033	0.133	0.142	0.056	ND	ND	ND	ND	0.062
Barium	ug/g	57.6	49.1	64.3	48.1	72.3	48.7	88.9	ND	ND	ND	ND	48.3
Beryllium	ug/g	<0.40	<0.20	<0.40	<0.20	<0.40	<0.30	<0.40	ND	ND	ND	ND	<0.20
Cadmium	ug/g	0.253	0.034	0.124	0.017	0.124	0.027	0.147	ND	ND	ND	ND	0.027
Chromium	ug/g	0.64	0.69	0.57	0.26	0.67	0.36	0.6	ND	ND	ND	ND	0.32
Cobalt	ug/g	<0.080	0.142	0.13	0.369	0.539	0.102	<0.080	ND	ND	ND	ND	0.28
Copper	ug/g	2.36	3.62	1.77	1.87	1.95	2.55	1.65	ND	ND	ND	ND	1.87
Lead	ug/g	0.776	0.379	1.01	0.105	0.627	0.106	0.55	ND	ND	ND	ND	0.127
Manganese	ug/g	214	187	179	75.9	287	188	164	ND	ND	ND	ND	91.6
Mercury	ug/g	0.0307	0.011	0.0311	0.004	0.0345	0.0058	0.0243	ND	ND	ND	ND	0.0044
Molybdenum	ug/g	0.075	0.265	0.076	0.105	<0.040	0.16	0.059	ND	ND	ND	ND	0.11
Nickel	ug/g	0.85	1.04	0.66	1.14	1.35	1.09	0.72	ND	ND	ND	ND	1.07
Selenium	ug/g	<0.80	<0.40	<0.80	<0.40	<0.80	<0.60	<0.80	ND	ND	ND	ND	<0.40
Strontium	ug/g	18.7	10.2	16.8	7.75	10.8	8.1	24.1	ND	ND	ND	ND	7.46
Thallium	ug/g	<0.040	<0.020	<0.040	<0.020	<0.040	<0.030	<0.040	ND	ND	ND	ND	<0.020
Tin	ug/g	<0.20	<0.10	<0.20	<0.10	<0.20	<0.15	<0.20	ND	ND	ND	ND	<0.10
Uranium	ug/g	0.0134	0.0211	0.0259	0.0966	0.0269	0.0156	0.0136	ND	ND	ND	ND	0.0776
Vanadium	ug/g	<0.40	<0.20	<0.40	<0.20	<0.40	<0.30	<0.40	ND	ND	ND	ND	<0.20
Zinc	ug/g	35.8	19	31.7	6.89	28.9	16.8	28.8	ND	ND	ND	ND	14.3
Bismuth	ug/g	<0.12	<0.060	<0.12	<0.060	<0.12	<0.090	<0.12	ND	ND	ND	ND	<0.060
Calcium	ug/g	4980	1470	3360	1050	1700	1290	5050	ND	ND	ND	ND	1120
Lithium	ug/g	<0.40	<0.20	<0.40	<0.20	<0.40	<0.30	<0.40	ND	ND	ND	ND	<0.20
Magnesium	ug/g	552	447	464	349	399	396	550	ND	ND	ND	ND	320
Moisture	%	13.2	47.4	13.2	65.6	9.98	46.7	15.4	ND	ND	ND	ND	62.2
Lead-210	Bq/g	ND	ND	ND	ND	0.35	ND	ND	0.52	0.15	0.16	0.5	ND
Polonium-210	Bq/g	ND	ND	ND	ND	0.36	ND	ND	0.45	0.15	0.15	0.49	ND
Radium-226	Bq/g	ND	ND	ND	ND	0.002	ND	ND	0.002	0.004	0.004	0.003	ND
Thorium-230	Bq/g	ND	ND	ND	ND	<0.005	ND	ND	<0.005	<0.005	0.005	<0.005	ND
Thorium-232	Bq/g	ND	ND	ND	ND	<0.005	ND	ND	<0.005	<0.005	<0.005	<0.005	ND

ND = No data

Attachment F Raw C

Parameters	Units	AREVA-KIGGAVIK KIG2-1 LICHEN	AREVA-KIGGAVIK KIG2-2 SEDGE	AREVA-KIGGAVIK KIG2-2 LICHEN	AREVA-KIGGAVIK KIG2-3 SEDGE	AREVA-KIGGAVIK KIG2-3 LICHEN	AREVA-KIGGAVIK KIG2-4 SEDGE	AREVA-KIGGAVIK KIG2-4 LICHEN	AREVA-KIGGAVIK KIG2-5 SEDGE	AREVA-KIGGAVIK KIG2-5 LICHEN	AREVA KIGGAVIK KIG2-2,4 SEDGE COMPOSITE	AREVA KIGGAVIK KIG2-1,3,5 SEDGE COMPOSITE	AREVA-KIGGAVIK KIG2-3,5 LICHEN COMPOSITE
		Lichen	Sedge	Lichen	Sedge	Lichen	Sedge	Lichen	Sedge	Lichen	Sedge Comp	Sedge Comp	Lichen Comp
Aluminum	ug/g	77	21.9	1270	14.4	101	16	106	839	287	ND	ND	ND
Antimony	ug/g	<0.040	<0.020	<0.040	<0.020	<0.040	<0.020	<0.040	<0.020	<0.040	ND	ND	ND
Arsenic	ug/g	0.065	0.029	0.147	<0.020	0.086	<0.020	0.113	0.51	0.181	ND	ND	ND
Barium	ug/g	93	21.9	46.8	30.7	63.8	21.2	51.7	66.7	243	ND	ND	ND
Beryllium	ug/g	<0.40	<0.20	<0.40	<0.20	<0.40	<0.20	<0.40	<0.20	<0.40	ND	ND	ND
Cadmium	ug/g	0.159	0.019	0.088	0.027	0.219	0.022	0.124	0.053	0.296	ND	ND	ND
Chromium	ug/g	0.71	<0.20	2.17	<0.20	0.81	0.26	0.74	22.8	1.45	ND	ND	ND
Cobalt	ug/g	0.124	0.106	0.398	<0.040	0.087	0.047	0.094	0.868	1.03	ND	ND	ND
Copper	ug/g	2.08	1.7	1.54	1.09	2.64	1.54	1.9	3.52	3.91	ND	ND	ND
Lead	ug/g	0.727	0.063	1.17	0.089	0.852	0.052	0.433	0.947	1.79	ND	ND	ND
Manganese	ug/g	167	63.3	97.3	64.7	143	136	124	176	293	ND	ND	ND
Mercury	ug/g	0.0268	0.0037	0.0508	0.0039	0.0324	0.0042	0.0356	0.002	0.0581	ND	ND	ND
Molybdenum	ug/g	0.078	0.176	0.069	0.343	0.101	0.151	0.071	0.443	0.181	ND	ND	ND
Nickel	ug/g	0.96	0.54	1.46	0.36	0.89	0.56	0.99	12.5	2.87	ND	ND	ND
Selenium	ug/g	<0.80	<0.40	<0.80	<0.40	<0.80	<0.40	<0.80	<0.40	<0.80	ND	ND	ND
Strontium	ug/g	21.5	4.86	12.8	6.63	22.2	5.29	17.3	14.2	44.5	ND	ND	ND
Thallium	ug/g	<0.040	<0.020	<0.040	<0.020	<0.040	<0.020	<0.040	<0.020	<0.040	ND	ND	ND
Tin	ug/g	<0.20	<0.10	<0.20	<0.10	<0.20	<0.10	<0.20	<0.10	<0.20	ND	ND	ND
Uranium	ug/g	0.0287	0.0072	0.0734	0.0358	0.0297	0.154	0.0238	0.0858	0.16	ND	ND	ND
Vanadium	ug/g	<0.40	<0.20	1.9	<0.20	<0.40	<0.20	<0.40	1.73	0.55	ND	ND	ND
Zinc	ug/g	40.4	10.3	20.1	9.42	30.5	8.55	30.8	14	47.3	ND	ND	ND
Bismuth	ug/g	<0.12	<0.060	<0.12	<0.060	<0.12	<0.060	<0.12	<0.060	<0.12	ND	ND	ND
Calcium	ug/g	4740	1080	2910	1520	6520	1180	4430	1310	10700	ND	ND	ND
Lithium	ug/g	<0.40	<0.20	4.34	<0.20	<0.40	<0.20	<0.40	0.89	<0.40	ND	ND	ND
Magnesium	ug/g	607	405	1080	445	719	500	627	568	789	ND	ND	ND
Moisture	%	13.2	56.5	11	59.4	14.2	53	12.6	54.7	11.5	ND	ND	ND
Lead-210	Bq/g	0.52	ND	0.51	ND	ND	ND	0.4	ND	ND	0.082	0.12	0.55
Polonium-210	Bq/g	0.38	ND	0.45	ND	ND	ND	0.35	ND	ND	0.076	0.12	0.56
Radium-226	Bq/g	0.002	ND	0.003	ND	ND	ND	0.002	ND	ND	0.002	0.002	0.01
Thorium-230	Bq/g	<0.005	ND	<0.005	ND	ND	ND	<0.005	ND	ND	<0.005	0.006	<0.005
Thorium-232	Bq/g	<0.005	ND	<0.005	ND	ND	ND	<0.005	ND	ND	<0.005	<0.005	<0.005

ND = No data

Attachment F Raw C

Parameters	Units	AREVA-KIGGAVIK KIG4-1 SEDGE	AREVA-KIGGAVIK KIG4-1 LICHEN	AREVA-KIGGAVIK KIG4-2 SEDGE	AREVA-KIGGAVIK KIG4-2 LICHEN	AREVA-KIGGAVIK KIG4-3 SEDGE	AREVA-KIGGAVIK KIG4-3 LICHEN	AREVA-KIGGAVIK KIG4-4 SEDGE	AREVA-KIGGAVIK KIG4-4 LICHEN	AREVA-KIGGAVIK KIG4-5 SEDGE	AREVA-KIGGAVIK KIG4-5 LICHEN	AREVA-KIGGAVIK KIG4-1,2 LICHEN COMPOSITE	AREVA KIGGAVIK KIG4-2,4 SEDGE COMPOSITE
		Sedge	Lichen	Sedge	Lichen	Sedge	Lichen	Sedge	Lichen	Sedge	Lichen	Lichen Comp	Sedge Comp
Aluminum	ug/g	97.3	128	30.3	76	142	1640	132	107	46.4	141	ND	ND
Antimony	ug/g	<0.020	<0.040	<0.020	<0.040	<0.020	<0.030	<0.020	<0.040	<0.030	<0.040	ND	ND
Arsenic	ug/g	0.06	0.091	0.044	0.064	0.054	0.405	0.132	0.069	0.031	0.109	ND	ND
Barium	ug/g	16.5	48.7	8.97	25.8	16.3	50.5	8.51	32.2	37.3	42.6	ND	ND
Beryllium	ug/g	<0.20	<0.40	<0.20	<0.40	<0.20	<0.30	<0.20	<0.40	<0.30	<0.40	ND	ND
Cadmium	ug/g	0.03	0.088	<0.010	0.154	0.029	0.123	0.018	0.089	0.034	0.136	ND	ND
Chromium	ug/g	7.24	1.45	<0.20	0.86	1.01	13.8	0.38	0.94	0.64	0.82	ND	ND
Cobalt	ug/g	0.217	0.323	0.101	0.092	0.559	3.84	0.311	0.184	0.062	0.204	ND	ND
Copper	ug/g	3.35	1.75	1.43	2.11	2.83	4.07	2.41	1.8	2.41	2.4	ND	ND
Lead	ug/g	0.184	0.788	<0.040	0.521	0.59	6.96	0.185	0.71	0.148	0.991	ND	ND
Manganese	ug/g	221	223	69.2	175	167	185	39.9	358	53.2	156	ND	ND
Mercury	ug/g	0.004	0.0413	0.0036	0.0395	0.0031	0.0588	0.0053	0.041	0.0132	0.0532	ND	ND
Molybdenum	ug/g	0.384	0.245	0.628	0.318	1.45	1.27	2.85	0.389	0.501	0.209	ND	ND
Nickel	ug/g	3.92	1.16	0.41	0.99	1.51	7.72	0.55	1.02	1.05	0.84	ND	ND
Selenium	ug/g	<0.40	<0.80	<0.40	<0.80	<0.40	<0.60	<0.40	<0.80	<0.60	<0.80	ND	ND
Strontium	ug/g	5.08	16.3	3.71	11.3	8.27	20	3.41	7.08	17.3	19	ND	ND
Thallium	ug/g	<0.020	<0.040	<0.020	<0.040	<0.020	0.069	<0.020	<0.040	<0.030	<0.040	ND	ND
Tin	ug/g	<0.10	<0.20	<0.10	<0.20	<0.10	<0.15	<0.10	<0.20	<0.15	<0.20	ND	ND
Uranium	ug/g	0.129	0.3	0.0566	0.0935	13.9	18.1	8.14	0.349	0.044	0.336	ND	ND
Vanadium	ug/g	0.25	<0.40	<0.20	<0.40	0.53	4.67	0.32	<0.40	<0.30	<0.40	ND	ND
Zinc	ug/g	10.5	23.6	14.2	31.2	10.4	23.7	15.3	34.8	11.9	27.2	ND	ND
Bismuth	ug/g	<0.060	<0.12	<0.060	<0.12	<0.060	0.726	<0.060	<0.12	<0.090	<0.12	ND	ND
Calcium	ug/g	542	2960	789	3310	1110	2900	721	1990	2870	3690	ND	ND
Lithium	ug/g	<0.20	<0.40	<0.20	<0.40	0.24	1.58	<0.20	<0.40	<0.30	<0.40	ND	ND
Magnesium	ug/g	237	419	310	527	375	749	310	393	652	638	ND	ND
Moisture	%	65.2	16.6	68.2	13.5	60	14.3	64.1	15.6	41.2	13.2	ND	ND
Lead-210	Bq/g	ND	ND	ND	ND	ND	0.64	ND	ND	ND	ND	0.46	0.056
Polonium-210	Bq/g	ND	ND	ND	ND	ND	0.58	ND	ND	ND	ND	0.41	0.039
Radium-226	Bq/g	ND	ND	ND	ND	ND	0.18	ND	ND	ND	ND	0.012	0.015
Thorium-230	Bq/g	ND	ND	ND	ND	ND	0.24	ND	ND	ND	ND	<0.005	0.01
Thorium-232	Bq/g	ND	ND	ND	ND	ND	<0.005	ND	ND	ND	ND	<0.005	<0.005

ND = No data

Attachment F Raw C

Parameters	Units	AREVA KIGGAVIK KIG4-1,3,5 SEDGE COMPOSITE	AREVA-KIGGAVIK KIG4-4,5 LICHEN COMPOSITE	AREVA-KIGGAVIK KIG5-1 SEDGE	AREVA-KIGGAVIK KIG5-1 LICHEN	AREVA-KIGGAVIK KIG5-2 SEDGE	AREVA-KIGGAVIK KIG5-2 LICHEN	AREVA-KIGGAVIK KIG5-3 SEDGE	AREVA-KIGGAVIK KIG5-3 LICHEN	AREVA-KIGGAVIK KIG5-4 SEDGE	AREVA-KIGGAVIK KIG5-4 LICHEN	AREVA-KIGGAVIK KIG5-5 SEDGE	AREVA-KIGGAVIK KIG5-5 LICHEN
		Sedge Comp	Lichen Comp	Sedge	Lichen	Sedge	Lichen	Sedge	Lichen	Sedge	Lichen	Sedge	Lichen
Aluminum	ug/g	ND	ND	61.3	25	36.3	72.3	31.5	135	107	79.5	35.2	106
Antimony	ug/g	ND	ND	<0.030	<0.020	<0.030	<0.040	<0.030	<0.030	<0.020	<0.030	<0.020	<0.040
Arsenic	ug/g	ND	ND	0.067	0.039	<0.030	0.071	0.044	0.098	0.074	0.109	0.257	0.115
Barium	ug/g	ND	ND	40.2	10.1	43.7	32.9	52.6	38.4	54.4	39.1	41.7	38.2
Beryllium	ug/g	ND	ND	<0.30	<0.20	<0.30	<0.40	<0.30	<0.30	<0.20	<0.30	<0.20	<0.40
Cadmium	ug/g	ND	ND	0.071	0.101	0.041	0.173	0.025	0.178	0.05	0.143	0.023	0.143
Chromium	ug/g	ND	ND	0.74	0.29	<0.30	0.58	<0.30	0.54	0.46	1	0.23	0.78
Cobalt	ug/g	ND	ND	0.171	0.05	0.088	<0.080	0.093	0.103	0.512	0.061	0.363	<0.080
Copper	ug/g	ND	ND	3.44	0.6	2.05	1.3	2.38	1.42	2.58	1.37	1.97	1.28
Lead	ug/g	ND	ND	0.186	0.141	0.081	0.298	0.072	0.347	0.123	0.354	0.072	0.465
Manganese	ug/g	ND	ND	169	35.8	120	35.1	116	88.1	173	46.9	100	109
Mercury	ug/g	ND	ND	0.0137	0.0111	0.0085	0.0276	0.0075	0.0272	0.0097	0.0292	0.0058	0.026
Molybdenum	ug/g	ND	ND	0.351	0.025	0.25	0.071	0.397	0.079	0.198	0.082	0.231	0.066
Nickel	ug/g	ND	ND	1.99	0.32	0.91	0.65	1.44	0.83	1.26	0.75	0.69	0.63
Selenium	ug/g	ND	ND	<0.60	<0.40	<0.60	<0.80	<0.60	<0.60	<0.40	<0.60	<0.40	<0.80
Strontium	ug/g	ND	ND	7.82	4.17	7.54	13.1	7.73	12.4	7.79	13.1	6.92	12.2
Thallium	ug/g	ND	ND	<0.030	<0.020	<0.030	<0.040	<0.030	<0.030	<0.020	<0.030	<0.020	<0.040
Tin	ug/g	ND	ND	<0.15	<0.10	<0.15	<0.20	<0.15	<0.15	<0.10	<0.15	<0.10	<0.20
Uranium	ug/g	ND	ND	0.0174	0.0055	0.0105	0.0126	0.0109	0.0269	0.0307	0.0657	0.0094	0.0117
Vanadium	ug/g	ND	ND	<0.30	<0.20	<0.30	<0.40	<0.30	<0.30	<0.20	<0.30	<0.20	<0.40
Zinc	ug/g	ND	ND	16.3	10.9	13.4	22.9	12.8	22.9	9.61	21.8	8.65	26.1
Bismuth	ug/g	ND	ND	<0.090	<0.060	<0.090	<0.12	<0.090	<0.090	<0.060	<0.090	<0.060	<0.12
Calcium	ug/g	ND	ND	2110	1740	2090	5440	2210	5000	2040	4790	1920	4330
Lithium	ug/g	ND	ND	<0.30	<0.20	<0.30	<0.40	<0.30	<0.30	<0.20	<0.30	<0.20	<0.40
Magnesium	ug/g	ND	ND	469	212	479	550	578	554	545	623	497	549
Moisture	%	ND	ND	51	29.3	48.9	27.9	46.5	27.6	50.6	24	59.5	19.2
Lead-210	Bq/g	0.32	0.44	ND	ND	ND	ND	ND	0.41	ND	ND	ND	ND
Polonium-210	Bq/g	0.29	0.4	ND	ND	ND	ND	ND	0.35	ND	ND	ND	ND
Radium-226	Bq/g	0.26	0.018	ND	ND	ND	ND	ND	0.002	ND	ND	ND	ND
Thorium-230	Bq/g	0.12	<0.005	ND	ND	ND	ND	ND	<0.005	ND	ND	ND	ND
Thorium-232	Bq/g	<0.005	<0.005	ND	ND	ND	ND	ND	<0.005	ND	ND	ND	ND

ND = No data

Attachment F Raw C

Parameters	Units	AREVA KIGGAVIK KIG5-2,4 SEDGE COMPOSITE	AREVA-KIGGAVIK KIG5-2,4 LICHEN COMPOSITE	AREVA KIGGAVIK KIG5-1,3,5 SEDGE COMPOSITE	AREVA-KIGGAVIK KIG5-1,5 LICHEN COMPOSITE
		Sedge Comp	Lichen Comp	Sedge Comp	Lichen Comp
Aluminum	ug/g	ND	ND	ND	ND
Antimony	ug/g	ND	ND	ND	ND
Arsenic	ug/g	ND	ND	ND	ND
Barium	ug/g	ND	ND	ND	ND
Beryllium	ug/g	ND	ND	ND	ND
Cadmium	ug/g	ND	ND	ND	ND
Chromium	ug/g	ND	ND	ND	ND
Cobalt	ug/g	ND	ND	ND	ND
Copper	ug/g	ND	ND	ND	ND
Lead	ug/g	ND	ND	ND	ND
Manganese	ug/g	ND	ND	ND	ND
Mercury	ug/g	ND	ND	ND	ND
Molybdenum	ug/g	ND	ND	ND	ND
Nickel	ug/g	ND	ND	ND	ND
Selenium	ug/g	ND	ND	ND	ND
Strontium	ug/g	ND	ND	ND	ND
Thallium	ug/g	ND	ND	ND	ND
Tin	ug/g	ND	ND	ND	ND
Uranium	ug/g	ND	ND	ND	ND
Vanadium	ug/g	ND	ND	ND	ND
Zinc	ug/g	ND	ND	ND	ND
Bismuth	ug/g	ND	ND	ND	ND
Calcium	ug/g	ND	ND	ND	ND
Lithium	ug/g	ND	ND	ND	ND
Magnesium	ug/g	ND	ND	ND	ND
Moisture	%	ND	ND	ND	ND
Lead-210	Bq/g	0.18	0.44	0.18	0.4
Polonium-210	Bq/g	0.12	0.41	0.12	0.39
Radium-226	Bq/g	0.002	0.002	0.004	<0.001
Thorium-230	Bq/g	<0.005	<0.005	<0.005	<0.005
Thorium-232	Bq/g	<0.005	<0.005	<0.005	<0.005

ND = No data

Attachment F Raw Chemistry Data, Plant Tissue 2009 (RSA)

Parameters	Units	8/30/2009 KIGGAVIK - REF2 STN.1/2/3 14W 0546101 7138189 BERRIES	8/30/2009 KIGGAVIK - REF2 STN.4/5 14W 0546158 7138119 BERRIES	8/8/2009 KIGGAVIK REF-1 STATION-1 14W 0557565 7152125 SEDGE	8/8/2009 KIGGAVIK REF-1 STATION-1 14W 0557565 7152125 LICHEN	8/8/2009 KIGGAVIK REF-1 STATION-2 14W 0557557 7152271 SEDGE	8/8/2009 KIGGAVIK REF-1 STATION-2 14W 0557557 7152271 LICHEN	8/8/2009 KIGGAVIK REF-1 STATION-3 14W 0557432 7152116 SEDGE	8/8/2009 KIGGAVIK REF-1 STATION-3 14W 0557432 7152116 LICHEN	8/8/2009 KIGGAVIK REF-1 STATION-4 14W 0557716 7152127 SEDGE	8/8/2009 KIGGAVIK REF-1 STATION-4 14W 0557716 7152127 LICHEN	8/8/2009 KIGGAVIK REF-1 STATION-5 14W 0557563 7151973 SEDGE	8/8/2009 KIGGAVIK REF-1 STATION-5 14W 0557563 7151973 LICHEN
Mercury	ug/g	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aluminum	ug/g	6.5	3.6	66	97	34	86	32	66	1.4	110	110	74
Antimony	ug/g	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Arsenic	ug/g	<0.05	<0.05	0.07	<0.05	<0.05	0.06	<0.05	0.07	<0.05	0.08	0.07	0.08
Barium	ug/g	11	9.9	77	41	53	32	87	41	8.9	38	60	27
Beryllium	ug/g	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Boron	ug/g	5	5	3	<1	5	<1	6	1	<1	<1	7	<1
Cadmium	ug/g	0.02	<0.01	0.18	0.18	0.12	0.09	0.04	0.21	<0.01	0.1	0.08	0.12
Chromium	ug/g	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Cobalt	ug/g	0.04	<0.01	0.28	0.08	0.09	0.09	0.05	0.05	<0.01	0.11	0.09	0.08
Copper	ug/g	4.5	4.3	2.3	1	4	0.99	2.6	1	0.37	0.96	4.3	1
Iron	ug/g	10	10	100	80	80	80	90	50	4.8	110	220	80
Lead	ug/g	0.03	0.03	0.35	0.46	0.33	0.7	0.18	0.29	0.02	0.54	0.38	0.53
Manganese	ug/g	90	60	1100	140	150	230	340	200	50	90	220	180
Molybdenum	ug/g	0.1	<0.1	0.8	<0.1	0.9	<0.1	0.6	<0.1	<0.1	<0.1	0.8	0.1
Nickel	ug/g	0.9	0.49	1.6	0.42	1.1	0.3	0.77	0.33	0.06	0.35	1.1	0.28
Selenium	ug/g	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Silver	ug/g	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Strontium	ug/g	16	5.6	8.9	15	9.6	9.4	12	14	1.6	10	11	6.8
Thallium	ug/g	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Tin	ug/g	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.06
Titanium	ug/g	0.13	0.24	3.6	2.5	0.89	2.8	1.1	2.2	0.06	3.1	6	2.6
Uranium	ug/g	<0.01	<0.01	0.02	0.01	0.04	<0.01	<0.01	<0.01	<0.01	0.01	0.03	<0.01
Vanadium	ug/g	<0.1	<0.1	<0.1	0.1	<0.1	0.2	<0.1	<0.1	<0.1	0.2	0.3	0.1
Zinc	ug/g	10	7.8	41	18	39	16	14	24	3.6	22	28	22
Moisture	%	84.19	80.65	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Lead-210	Bq/g	0.089	0.031	0.38	0.56	0.31	0.62	0.33	0.49	0.14	0.6	0.21	0.58
Polonium-210	Bq/g	0.006	0.011	0.31	0.44	0.26	0.59	0.24	0.36	0.12	0.52	0.16	0.64
Radium-226	Bq/g	0.002	0.002	0.006	0.004	0.002	0.007	0.004	0.002	<0.001	0.001	0.002	0.004
Thorium-230	Bq/g	<0.002	<0.002	<0.002	<0.003	<0.002	<0.003	<0.002	<0.003	<0.002	<0.003	<0.002	<0.003
Thorium-232	Bq/g	<0.002	<0.002	<0.002	<0.003	<0.002	<0.003	<0.002	<0.003	<0.002	<0.003	<0.002	<0.003

Attachment F Raw C

Parameters	Units	8/8/2009 KIGGAVIK REF-2 STATION-1 14W 0546096 7138092 SEDGE	8/8/2009 KIGGAVIK REF-2 STATION-1 14W 0546096 7138092 LICHEN	8/8/2009 KIGGAVIK REF-2 STATION-2 14W 0546096 7138223 SEDGE	8/8/2009 KIGGAVIK REF-2 STATION-2 14W 0546096 7138223 LICHEN	8/8/2009 KIGGAVIK REF-2 STATION-3 14W 0545946 7138065 SEDGE	8/8/2009 KIGGAVIK REF-2 STATION-3 14W 0545946 7138065 LICHEN	8/8/2009 KIGGAVIK REF-2 STATION-4 14W 0546276 7138060 SEDGE	8/8/2009 KIGGAVIK REF-2 STATION-4 14W 0546276 7138060 LICHEN	8/8/2009 KIGGAVIK REF-2 STATION-5 14W 0546096 7137923 SEDGE	8/8/2009 KIGGAVIK REF-2 STATION-5 14W 0546096 7137923 LICHEN
Mercury	ug/g	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aluminum	ug/g	51	120	41	130	140	98	56	68	56	310
Antimony	ug/g	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Arsenic	ug/g	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.09
Barium	ug/g	95	92	81	55	110	74	54	19	89	130
Beryllium	ug/g	0.02	0.03	<0.01	0.02	0.05	0.02	<0.01	<0.01	0.01	0.05
Boron	ug/g	3	<1	3	1	3	1	1	<1	1	1
Cadmium	ug/g	0.05	0.07	0.05	0.06	0.05	0.07	0.03	0.03	0.05	0.11
Chromium	ug/g	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Cobalt	ug/g	0.2	0.18	0.29	0.37	0.12	0.16	0.19	0.07	0.14	0.31
Copper	ug/g	2.6	0.85	2.3	1.4	1.9	1.5	1.5	0.56	1.8	2.4
Iron	ug/g	80	110	70	110	80	90	80	80	70	470
Lead	ug/g	0.48	0.5	0.49	0.87	0.71	0.47	0.59	0.37	0.57	3
Manganese	ug/g	180	350	600	250	440	250	330	190	590	140
Molybdenum	ug/g	0.3	<0.1	0.5	<0.1	0.4	<0.1	1.1	<0.1	0.3	<0.1
Nickel	ug/g	1.1	0.52	0.65	0.83	0.66	0.71	0.57	0.21	0.48	0.94
Selenium	ug/g	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Silver	ug/g	<0.01	<0.01	<0.01	0.01	<0.01	0.01	<0.01	<0.01	<0.01	0.03
Strontium	ug/g	63	100	110	57	68	68	38	19	26	32
Thallium	ug/g	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Tin	ug/g	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.21
Titanium	ug/g	1	4.7	1.3	5.8	0.75	3.1	1.2	4.6	1.5	17
Uranium	ug/g	0.02	0.02	<0.01	0.02	0.02	0.02	<0.01	<0.01	<0.01	0.04
Vanadium	ug/g	0.1	0.2	<0.1	0.2	<0.1	0.2	<0.1	0.1	<0.1	0.6
Zinc	ug/g	60	15	70	19	33	16	60	13	70	21
Moisture	%	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Lead-210	Bq/g	0.42	0.54	0.26	0.63	0.37	0.48	0.34	0.58	0.43	0.71
Polonium-210	Bq/g	0.33	0.47	0.22	0.65	0.29	0.4	0.24	0.54	0.38	0.65
Radium-226	Bq/g	0.008	0.006	0.004	0.005	0.006	0.004	0.007	<0.001	0.007	0.011
Thorium-230	Bq/g	<0.002	<0.003	<0.002	<0.003	<0.003	<0.003	<0.002	<0.003	0.004	0.006
Thorium-232	Bq/g	<0.002	<0.003	<0.002	<0.003	<0.003	<0.003	<0.002	<0.003	<0.002	<0.003

Attachment G Ecological Land Classification Survey Plot Data – Soils

File: VSBR/Attachment G Soils Summary

Attachment D Ecological Land Classification Survey Plot Data - Soils

						Grade				Class Size					Kind								Consistence			Coarse Fragment					Shape		Mottles						Roots								
Date	Plot Number	Photos	Class	Horizon	Depth	weak	moderate	strong	none	very fine	fine	medium	coarse	very coarse	subangular blocky	angular blocky	granular	massive	single grained	columnar	prismatic	platy	dry	moist	wet	pebble	gravel	cobble	boulder	total	Round	Angular	few	common	many	fine	medium	coarse	few	common	many	fine	medium	coarse	restricting	Texture	Comments
06-Aug-09	13D	5964 + 5965	BR.TC (FROZEN)	LFH	3-0																																			X		X					
				Ahg	1-6																					10	20	30		60		X								X		X				SCL	
				Bgy	6-15																					10	20	30		60		X							X			X			10	SCL	
				BmyZ	15-30+																					15	20			35		X														SCL	Churned soil with frozen Bm - Till throughout
06-Aug-09	15C	5961	BR.SC	Of	1-3																																			X		X					
				Oh	3-6																																			X		X					
				Ah	6-10																						2			2		X	X			X				X		X				SL	
				Bg	10-29																												X			X				X		X			20	SL	
				Bn	29-46+																																									SL	Organic over very sandy soil with water filling in at 37cm
23-Jul-09	17B	1014911	GL.SC	LFH	3-0																																										
				Ag	0-7																																										
				Bgz	7-21																																										
				Cgz	21+																				PLIABLE	3	5			8		X			X		X			X		X			6	SILT CLAY LOAM	GLEYED FROZEN SOIL
21-Jul-09	24C	4806 + 4807	BR.SC	LFH	0-2.5																																										
				Ah	2.5-4.5																																										
				Bm	4.5-7.5																																										
				BCg	7.5-30									X										FIRM		X	X	X		10															4	L5	
22-Jul-09	27D	1014846	BR.SC	LFH	2-0																																										
				Ah	0-3																																										
				Bm	3-20																																										
				bc	20-50+		X							X				X						FIRM										X				X							7	LOAMY SAND	VERY RED WELL DRAINED SOIL WITH MOTTLES - WATER SEEPING IN AT 50CM
22-Jul-09	28C	1014849	BR.TC (FROZEN)	LFH	5-0																																										
				Ah	0-8																																										
				BCgZ	8-37+																			X		5	5			10			X			X				X		X			6	SCL	FROZEN - SILTY - CLAY - CLAY/LOAM SOIL WITH LELTING OCCURING AT 10CM ON EXPOSED PROFILE
22-Jul-09	29A	1014842 + 843	BR.TC	Of	0-5																																										
				Om	5-9(30)																																										
				Bmy	9-40														X						X	30	30			60				X		X										LOAMY	CHURNED SOILS WITH WATER SEEPING IN AT 40CM
22-Jul-09	30D	4839	BR.SC	LFH	2-0																																										
				Aeh	0-4																																			X			X		5		
				Bm	4-29																					5	15			20																	
				BCx	29+																																										Very red with frozen clumps - appears to have abundanat silt and clay - frozen throughout
22-Jul-09	32C	1014836	BR.SC	LFH	3-0																																										
				Ah	0-4																																										
				Bm	4-17																																									FINE LOAMY SAND	
				BCg	17-46+		X							X									FIRM			3	5			8					X										6	FIND LOAMY SAND	WELL DRAINED WITH MOTTLES - VERY SIMILAR TO 33D
22-Jul-09	33D	1014833	BR.SC	LFH	4-0																																										
				Ah	0-3																																										
				Bm	3-27																																									FINE LOAMY SAND	
				Bcd	27-40+		X							X									FIRM			4	5			10				X											5	FINE LOAMY SAND	
22-Jul-09	34D	1014855	BR.SC (FROZEN)	LFH	2-0																																										
				Ah	0-6																																										
				Bmgz	6-17																																										
				Cz	17-36																					2	8			10				X			X		X			X			7	LOAMY SAND	FINER TEXTURED SOIL WITH SOME LARGE FROZEN MOTTLES AT 10CM
	35B	1014861	BR.TC	LFH	9-0																																										
				Ahy	2-9																																										
				Bmy	9-23		X																	FIRM		1	7	2		10			X			X				X		X				SANDY-CLAY LOAM	VERY SIMILAR TO 39C - C LAYER IS FROZEN - CHURNED SOILS
				Cy	23+																																										
22-Jul-09	37E	1014852	O.TC	LFH	6-0																																										
				Ahy	0-7																																										
				Bmy	7-16																																										
				Cy	16-36+																		FIRM			5	20	10		35	X	X	X			X				X		X				SANDY LOAM	-GLACIAL TILL WITH ABUNDANT CHURNING - LFH DIPS TO 14CM IN SOME SPOTS - UNSORTED ANGULAR AND ROUND GRAVEL AND COBBLES THROUGH OUT - WELL DRAINED.
21-Jul-09	38G	1014821 + 4822	O.TC	Ahy	0-4		X					X			X																															LOAMY SAND	
				Aejy	4-8																																										
				Bmjy	8-12																																									FINE LOAMY SAND	
				Cy	12-33+																					9	5	1	5	20																FOAMY SAND	SOILS CHURNED AND MIXED = CRYOTURBULATION
22-Jul-09	39C	1014858	BR.TC	LFH	3-0																																										
				Ahy	0-9																																										
				Bgy	9-33																																										
				BCy	33+																					3	5	5	2	15	X	X	X			X				X		X			10	SANDY CLAY LOAM	CHURNED SOIL WITH C HORIZON PREDOMINANTLY CLAY - ROOTING LAYER VARIES
23-Jul-09	40B	1014908	BR.SC (FROZEN)	LFH	4-0																																										
				Aeg	0-8																																										
				Bgz	8-26		X																			3	5			8	X		X				X		X				X		5CM	SANDY CLAY LOAM	
				BCz	26+																																										FROZEN SOIL WITH GLAYING/MOTTLES THROUGHOUT - FAIRLY WELL DRAINED
23-Jul-09	41C	1014900 + 901	O.TC	LFH	0-3																																										
				Ah	0-6																																										
				Bmz																				FIRM		2	2			4	X		X				X			X		X			9	SANDY CLAY LOAM	
				BCz	15-43+		X							X					X																												REDDISH SOIL WITH FROZEN SPOTS THROUGHOUT AND SOME MOTTLING
23-Jul-09	42D	1014897	R.SC	LFH	5-0																																										
				Ag	0-5																																										
				C	5-25+																					30	20	2		52		X									X		X			LOAMY SAND	GLACIAL TILL - LTD SOIL DEVELOPMENT MOSTLY GRAVELS AND COBBLES - WELL DRAINED
24-Jul-09	43C	1014945 + 946	BR.SC	LFH	4-0																																										
				Ah	1-9																					1	1			2	X									X		X					
				Bh	9-24																					1	3			4		X	X			X			X			X			10	SANDY CLAY LOAM	

Attachment D Ecological Land Classification Survey Plot Data - Soils

						Grade				Class Size					Kind								Consistence			Coarse Fragment					Shape		Mottles						Roots								
Date	Plot Number	Photos	Class	Horizon	Depth	weak	moderate	strong	none	very fine	fine	medium	coarse	very coarse	subangular blocky	angular blocky	granular	massive	single grained	columnar	prismatic	platy	dry	moist	wet	pebble	gravel	cobble	boulder	total	Round	Angular	few	common	many	fine	medium	coarse	few	common	many	fine	medium	coarse	restricting	Texture	Comments
				Bf	24-34																						X					X	X			X										SCL	FROZEN SOILS WITH VERY FEW COARSE FRAGS
26-Jul-09	ML-01	1014987-88	GL.SC	Of	0-3																														X	X											
				Oh	3-7																																			X		X					
				Bg	7-29																																			X		X				SILTY LOAM	
				Cz	29+																																										VERY FIBEROUS - STRONG ODOR OF DECOMPOSITION - C LAYER FROZEN SOLID - WATER SEEPING INTO PIT
26-Jul-09	ML-02	1014994-96	GL.TC	Of	0-9																																				X	X					
				Oh	9-14(24)																													X		X											
				Bgy	14-31																					2	15	3		20					X	X				X		X			20	SCL	
				Cyz	31+																																										TRANSITION SITE - DISTINCT LAYERING BUYT ALSO SOME CHURNING OF SOILS IN PIT - PARTIALY FROZEN
26-Jul-09	ML-03	1015005	GL.SC	LFH	5-0																																			X			X				
				Ah	1-6																					10	10			20		X			X		X			X			X				
				Bg	6-20+																														X		X			X		X					
27-Jul-09	ML-04	1015060	BR.TC	LFH	3-0																																			X		X					
				Ahy	1-6 (19)																						30			30	X			X		X									6		
				Bgy	6-25																						30			30		X		X			X									SL	
				Cy	35-36+																						1			1																SL	VERY WELL DRAINED SOIL WITH LTD MINERAL DEVELOPMENT
27-Jul-09	ML-05	1015063	BR.TC	LFH	5-0 (28)																																										
				Agy	1-7																						20			20		X		X			X			X		X					
				Bgy	7-34																						40	10	10	60		X		X			X		X			X			20	SL	
				ROCK	34+																																										CREST POSITION SITE WITH CHURNED SOILS + NUMEROUS ANGULAR GRAVEL (COBBLES + BOULDERS)
27-Jul-09	ML-06	1015066	GL.SC	Of	0-3																																				X	X					
				Oh	3-6																						30			30											X	X					
				Ag	6-10																						30			30			X			X				X		X					
				Bg	10-30+																						30			30			X			X				X		X			28	SiL	VERY SILTY - CLAY SOIL WITH NUMEROUS GRAVELS - MANY ROOTS
27-Jul-09	ML-07	1015069	BR.TC	LFh	3-0																																										
				Ah	0-7																						10			10			X				X			X			X				
				Bgy	7-23																						20	20		40			X				X		X			X			9	SCL	
				ROCK	23+																																										CHURNED GLACIAL TILL
27-Feb-09	ML-08	1015072	THU.OC	Of	0-4																																				X	X					
				Oh	4-20																																				X	X			20		
				C	20-30+																						15	5		20		X														SC	DOWNSLOPE OF POND - TRANSITION FROM DRY TO WET THICK ORGANIC OVER TILL
28-Jul-09	ML-09/KIG3	101581 + 582	BR.SC	MOSS	0-1																																										
				LFH	6-1																																										
				Ah	6-8																																			X			X				
				Bg	8-27																					4	10	1		15	X		X			X			X			X			10	SCL	
				Cz	27-35+																																										THICK ORGANIC LAYER OVER COMPACT MINERAL LAYER - PIT FROZEN AFTER 35cm
28-Jul-09	ML-10/KIG4	1015090	BR.TC	LFH	7-0																																		X				X				
				Ah	7-14 (27)																						2		1	3		X		X			X			X		X			14		
				Bgy	14-24																						15	5	1	21		X		X			X									SL	
				Cy	24-50+																						10	10	1	21		X	X				X									SCL	THICK ORGANIC LAYER OVER WELL DRAINED CHURNED SOILS WITH OCCASIONAL LARGE BOULDERS
28-Jul-09	ML-11/KIG2	1015093 + 5094	BR.TC (FROZEN)	LFH	4-0																																										
				Ahy	1-9 (18)																						2			2		X		X			X			X		X			18		
				Bgyz	9-33+																						5			5		X		X			X										CHURNED SOILS OVER FROZEN MINERAL LAYER, BE LAYER MELTING DURING ASSESSMENT
28-Jul-09	ML-12/KIG1	1015099 + 5100	BR.SC (FROZEN)	LFH	4-0																																			X			X				
				Ah	2-6																					1				1			X			X				X		X				SCL	
				Bmz	6-30																					1	10			11				X				X	X			X			10	SiL	
				Cz	30-36+																																										FROZEN MINERAL SOIL - MELTING DURING ANALYSIS, SIDES PUSHING IN
28-Jul-09	ML-13/SIS1	1015103	BR.TC	LFW	4-0																					1	2	1		4		X								X			X				
				Ahy	4-8 (20)																					1	2	1		4		X		X			X			X		X					
				Bgy	8-30																					10	10	10		30		X		X			X		X			X			24	SCL	
				Bmy	30-36																					1	7	2		10		X		X			X									SCL	
				Cz	36-40+																																									SiC	CHURNED WELL DRAINED MINERAL SOIL WITH FROZEN SILTY C LAYER
28-Jul-09	ML-14	1015106 + 107	BR.TC	LFH	4-0																																			X		X					
				Ahy	2-6 (14)																						1	10	50	60										X		X					
				Bmy	6-23																						1	20	50	70									X			X			14		
				ROCK	23+																																										EXTREME OCCURRENCE OF BOULDERS IN ALL LAYERS - VERY SANDY
28-Jul-09	ML-15	1015111 + 5112	TF.OC	MOSS	0-5																																										
				Of	5-11																					2	3	5	5	15		X								X		X					
				Oh	11-30																					2	3	20	40	65		X							X			X			30		
				ROCK	30+																																										THICK PEAT-ORGANIC LAYER IN VERY MIXED GLACIAL TILL - PIT IN DEPRESSION ONE TO NUMEROUS BOULDERS IMPEDING DIGGING
05-Aug-09	ML-16	5861 - 5862	BR.TC	MOSS	1-7																																				X	X					
				Agy	7-10																																			X			X				
				Bgy	10-40																					10	10	10		30		X	X				X			X		X			15	SL	EXTREMEMLY CHURNED SOIL WITH LARGE COBBLES - SIGNIFICANT GLEYING. VERY WELL DRAINED GLACIAL TILL
05-Aug-09	ML-17	5865	BR.SC	Of	0-2																																			X		X					
				Oh	2-4																																			X		X					
				Bm	4-40																					10	20	5	35			X		X			X		X			X			30		
				C	40+																																										ORGANIC OVER VERY SANDY MINERAL SOIL - MOTTLING THOROUGHLY. TRANSITION FROM DRY TO WET
05-Aug-09	ML-18	5875	BR.SC (FROZEN)	MOSS	0-1																																			X			X				
				LFH	3-0																																			X			X				
				Ahz	2-4																					30				30	X		X			X			X	X							
				Bgz	4-11																					30				30	X			X				X								SCL	
				Bmz	11-40+																					30				30	X			X				X								SCL	EXTREMELY FROZEN SOIL ALMOST TO SURFACE - SIGNIFICANT MOTTLING
05-Aug-09	ML-19	5878	BR.SC (FROZEN)	LFH	3-0																																										
				Ahz	2-4																					10	50			60		X	X			X			X			X					
				Bgz	4-12																					10	50			60		X	X			X			X			X			10	SCL	
				Bmz	12-32																					5	5			10			X				X									SCL	

Attachment D Ecological Land Classification Survey Plot Data - Soils

Date	Plot Number	Photos	Class	Horizon	Depth	Grade				Class Size					Kind								Consistence			Coarse Fragment					Shape		Mottles						Roots							Texture	Comments
						weak	moderate	strong	none	very fine	fine	medium	coarse	very coarse	subangular blocky	angular blocky	granular	massive	single grained	columnar	prismatic	platy	dry	moist	wet	pebble	gravel	cobble	boulder	total	Round	Angular	few	common	many	fine	medium	coarse	few	common	many	fine	medium	coarse	restricting		
				Cz	32-41+																					5	5			10																SCL	FROZEN SOIL WITH ANGULAR GRAVEL IN FIRST 10cm (GLACIAL TILL) - MOTTLING THROUGHOUT
	ML-20	5926 - 927	BR.SC	LFH	3-0																					5	5	50		60		X									X	X					
				Ah	2-6																					10	40			50		X		X			X		X			X			5	SL	
				Bgz	6-15																					10	40			50		X			X		X									SCL	
				Bmz	15-25																					10	40			50		X			X		X									SCL	
				Cz	25+																																									SCL	VENEER OF GLACIAL TILL OVER FROZEN MINERAL SOIL
06-Aug-09	ML-21	5951 + 5952	BR.TC	LFH	1-0																																				X	X					
				Aey	1-4																					5	10	5	40	60		X	X				X		X			X				SL	
				Bgy	4-30+																					5	10	5	40	60		X	X				X		X			X			10	SL	CHURNED MORAINE - VERY SANDY WITH LARGE BOULDERS - LTD SOIL DEVELOPMENT
06-Aug-09	ML-22	5955	BR.TC	LFH	4-0																																				X	X					
				Aey	2-6																					15	15	25		55				X			X			X		X				SL	
				Bmy	6-30																					15	15	25		55				X			X		X			X			20	SL	
				C	30-40+																																									SCL	CHURNED SANDY SOIL WITH FAIRLY LARGE MOTTLING
06-Aug-09	ML-23	5958	BR.SC (FROZEN)	LFH	3-0																																			X		X					
				Ahz	2-7																					10	10			20		X	X			X			X			X				SCL	
				Bmz	7-23+																					10	10			20		X	X			X			X			X			9	SCL	FROZEN MINERALIZED SOIL
21-Jul-09	Q24	1014829	BR.SC	LFH	0-2																																										
				Acj	2-3																																										
				BC	3-20+																					20	5	5		30																SANDY LOAM	Bedrock crest - ltd soil development - mainly sand-gravel+cobbles
24-Jul-09	1E	1014950	BR.SC	LFH	2-0																																										
				Ah	1-3																																										
				Bhz	3-27+																						10			10				X			X				X				3	SC	Frozen almost to surface - Large Fe Mottles
24-Jul-09	2E	1014928	TFI.OC	Of	0-5																																				X	X					
				Om	5-14																																				X	X					
				Oh	14-31																						5	2		7										X		X			30		
				C	31+																					5	10	80		90		X															Organic on Glacial Till
24-Jul-09	3D	1014931 + 932	GL.SC	LFH	5-0																																			X		X					
				Ah	0-7																																										
				Bgz	7-25																						5			5		X		X			X									SILTY CLAY LOAM	Frozen soil with glaying and mottling
24-Jul-09	4E	1014953	BR.SC	Of	0-3																																			X			X				
				Oh	3-9																								1	1		X								X			X		10	SCL	
				Bm	9-29																						10			10		X															
				Cz	29+																																										9cm organic layer over distinct B layer - C layer frozen
24-Jul-09	5D	1014956	H.SC	Oh	0-19																					1	1	1		3	X																
				Ah	19-23																					1	2	1		4	X									X	X	X			23		
				BgB	23-40+																					1	5	1		7	X			X			X									SCL	Thick organic over frozen mineral layer
23-Jul-09	9F	10149	O.SC	LFW	3-0																																										
				Ah	3-6																																										
				Bm	6-16																														X		X		X			X					Very Sandy well drained soil

Attachment H Soil Raw Chemistry Data

File: VSBR/Attachment H Soil Chemistry

Attachment H Raw Chemistry Data, Soil

Parameters	Units	2007 Mine LSA										
		8/28/2007 SIS1S (SOIL)	8/28/2007 SIS2S (SOIL)	8/27/2007 SIS3S (SOIL)	8/27/2007 KIG1S (SOIL)	8/27/2007 KIG2S (SOIL)	8/27/2007 KIG3S (SOIL)	8/29/2007 SIS1PE (PEAT)	8/28/2007 SIS2PE (PEAT)	8/30/2007 KIG1PE (PEAT)	8/29/2007 KIG2PE (PEAT)	8/30/2007 KIG3PE (PEAT)
Mercury	ug/g	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.10	0.05	0.12	0.08	0.07
Aluminum	ug/g	7300	19700	7300	9400	11100	10300	4400	37200	22600	32000	28200
Antimony	ug/g	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1
Arsenic	ug/g	2.9	7	2.1	5.5	4.8	4.9	1.2	3.8	2.3	3.4	3.8
Barium	ug/g	84	130	60	300	210	240	260	560	760	910	750
Beryllium	ug/g	0.5	1	0.5	0.6	0.7	0.8	0.40	0.83	0.69	0.87	2.1
Boron	ug/g	<1	6	<1	<1	<1	<1	10	41	24	41	54
Cadmium	ug/g	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.31	0.76	0.81	0.89	0.48
Chromium	ug/g	9.6	44	16	25	21	25	4.6	30	24	23	31
Cobalt	ug/g	3.4	8.9	2.9	5.4	4.1	6.4	1.3	4.0	2.0	3.3	2.5
Copper	ug/g	4.8	18	6.2	16	7.7	19	11	96	96	80	42
Iron	ug/g	9400	25000	10600	15800	11900	16600	8000	11700	5700	11800	9800
Lead	ug/g	4.8	5.4	4.8	16	7.4	8.9	0.74	8	8	13	85
Manganese	ug/g	110	280	100	200	140	230	11	210	150	150	70
Molybdenum	ug/g	0.2	0.2	0.2	0.4	0.2	6.9	0.7	0.8	1.5	1.1	2.0
Nickel	ug/g	9.7	34	9.3	17	15	16	7.4	25	19	24	25
Selenium	ug/g	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.37	0.62	0.76	0.61	0.49
Silver	ug/g	<0.1	<0.1	<0.1	<0.1	0.4	<0.1	0.06	0.25	0.22	0.22	0.11
Strontium	ug/g	61	74	55	75	99	73	47	62	110	80	70
Thallium	ug/g	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.05	0.38	0.28	0.34	0.25
Tin	ug/g	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	<0.05	<0.05	<0.05	0.12
Titanium	ug/g	300	410	230	350	340	320	54	280	350	310	390
Uranium	ug/g	0.7	0.8	0.7	1	1	1.6	0.65	4	5	6	6
Vanadium	ug/g	16	47	17	25	21	24	4.3	30	20	20	40
Zinc	ug/g	14	35	16	38	21	26	6.2	50	25	35	19
Moisture	%	16.03	14.25	7.77	22.61	16.64	17.45	83.64	75.65	78.17	76.62	74.36
pH	pH units	5.47	4.85	6.45	4.86	4.96	4.97	ND	ND	ND	ND	ND
Lead-210	Bq/g	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.01	0.08	0.04	0.13	<0.006
Polonium-210	Bq/g	0.02	0.02	0.02	0.03	0.02	0.03	0.016	0.058	0.058	0.47	0.004
Radium-226	Bq/g	0.03	0.02	0.05	0.07	0.04	0.06	0.048	0.09	0.06	0.14	0.06
Thorium-230	Bq/g	0.04	0.04	0.02	0.06	0.03	0.05	0.017	0.049	0.06	0.05	0.06
Thorium-232	Bq/g	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Calcium	mg/L	76	79	68	100	100	75	ND	ND	ND	ND	ND
Chloride	mg/L	10	11	8	13	10	11	ND	ND	ND	ND	ND
Magnesium	mg/L	21	28	18	22	22	27	ND	ND	ND	ND	ND
Potassium	mg/L	4	4	6	8	3	6	ND	ND	ND	ND	ND
Sodium	mg/L	4	4	6	3	4	4	ND	ND	ND	ND	ND
Sodium Absorption Ratio	--	0.1	0.1	0.2	0.05	0.1	0.1	ND	ND	ND	ND	ND
Specific conductivity	uS/cm	478	588	477	592	594	463	ND	ND	ND	ND	ND
Sulfate	mg/L	51	50	59	85	87	71	ND	ND	ND	ND	ND
Saturation	%	29.0	26.4	19.1	38.0	30.8	32.7	ND	ND	ND	ND	ND

ND = No data

Attachment H Raw Chemis

Parameters	Units	**2008 Mine LSA**										
		AREVA KIGGAVIK SIS5 #1 SOIL	AREVA KIGGAVIK SIS5 #2 SOIL	AREVA KIGGAVIK SIS5 #3 SOIL	AREVA KIGGAVIK SIS5 #4 SOIL	AREVA KIGGAVIK SIS5 #5 SOIL	AREVA-KIGGAVIK SIS5 #1-5 COMPOSITE	AREVA KIGGAVIK SIS4 #1 SOIL	AREVA KIGGAVIK SIS4 #2 SOIL	AREVA KIGGAVIK SIS4 #3 SOIL	AREVA KIGGAVIK SIS4 #4 SOIL	AREVA KIGGAVIK SIS4 #5 SOIL
Mercury	ug/g	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	ND	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Aluminum	ug/g	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Antimony	ug/g	<10	<10	<10	<10	<10	ND	<10	<10	<10	<10	<10
Arsenic	ug/g	<5.0	<5.0	<5.0	<5.0	<5.0	ND	<5.0	<5.0	<5.0	<5.0	<5.0
Barium	ug/g	32	56.3	29.1	26.6	38.5	ND	32.4	40	61	44.2	52.4
Beryllium	ug/g	<0.50	<0.50	<0.50	<0.50	<0.50	ND	<0.50	<0.50	<0.50	<0.50	<0.50
Boron	ug/g	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cadmium	ug/g	<0.50	<0.50	<0.50	<0.50	<0.50	ND	<0.50	<0.50	<0.50	<0.50	<0.50
Chromium	ug/g	11.2	12.9	10.7	10.6	13.7	ND	8.4	11.4	11.4	11	12.7
Cobalt	ug/g	2.7	3	2.6	2.2	2.8	ND	2	2.7	2.7	2.4	2.8
Copper	ug/g	2.7	3.7	3.1	2.9	4.5	ND	2.2	4.2	7.6	5.6	3.1
Iron	ug/g	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Lead	ug/g	<30	<30	<30	<30	<30	ND	<30	<30	<30	<30	<30
Manganese	ug/g	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Molybdenum	ug/g	<4.0	<4.0	<4.0	<4.0	<4.0	ND	<4.0	<4.0	<4.0	<4.0	<4.0
Nickel	ug/g	7.3	7.6	6.1	5.5	8.3	ND	<5.0	6.5	7	6.7	7.1
Selenium	ug/g	<2.0	<2.0	<2.0	<2.0	<2.0	ND	<3.0	<2.0	<2.0	<2.0	<2.0
Silver	ug/g	<2.0	<2.0	<2.0	<2.0	<2.0	ND	<2.0	<2.0	<2.0	<2.0	<2.0
Strontium	ug/g	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Thallium	ug/g	<1.0	<1.0	<1.0	<1.0	<1.0	ND	<1.0	<1.0	<1.0	<1.0	<1.0
Tin	ug/g	<5.0	<5.0	<5.0	<5.0	<5.0	ND	<5.0	<5.0	<5.0	<5.0	<5.0
Titanium	ug/g	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Uranium	ug/g	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vanadium	ug/g	11.7	13.2	11.6	10.5	14	ND	10	11.2	11.3	11.1	12.9
Zinc	ug/g	8.6	9.4	8.2	7.8	10.6	ND	8.8	11.8	12.3	10.2	11
Moisture	%	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
pH	pH units	6.78	6.64	5.7	5.98	5.96	ND	6.64	6.82	6.9	6.9	6.89
Lead-210	Bq/g	ND	<0.02	<0.02	ND	ND	<0.02	ND	0.04	<0.02	ND	ND
Polonium-210	Bq/g	ND	0.02	0.02	ND	ND	0.02	ND	0.02	0.02	ND	ND
Radium-226	Bq/g	ND	<0.01	0.03	ND	ND	0.02	ND	<0.01	0.02	ND	ND
Thorium-230	Bq/g	ND	0.03	0.02	ND	ND	0.03	ND	0.02	0.04	ND	ND
Thorium-232	Bq/g	ND	0.05	0.03	ND	ND	0.04	ND	0.03	0.03	ND	ND
Calcium	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloride	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Magnesium	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Potassium	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sodium	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sodium Absorption Ratio	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Specific conductivity	uS/cm	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sulfate	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Saturation	%	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

ND = No data

Attachment H Raw Chemis

Parameters	Units	2008 Mine LSA										
		AREVA-KIGGAVIK SIS4 #1-5 COMPOSITE	AREVA KIGGAVIK SIS1 #1 SOIL	AREVA KIGGAVIK SIS1 #2 SOIL	AREVA KIGGAVIK SIS1 #3 SOIL	AREVA KIGGAVIK SIS1 #4 SOIL	AREVA KIGGAVIK SIS1 #5 SOIL	AREVA-KIGGAVIK SIS1 #1-5 COMPOSITE	AREVA KIGGAVIK K1G3 #1 SOIL	AREVA KIGGAVIK K1G3 #2 SOIL	AREVA KIGGAVIK K1G3 #3 SOIL	AREVA KIGGAVIK K1G3 #4 SOIL
Mercury	ug/g	ND	<0.0050	<0.0050	<0.0050	0.0071	<0.0050	ND	<0.0050	<0.0050	<0.0050	<0.0050
Aluminum	ug/g	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Antimony	ug/g	ND	<10	<10	<10	<10	<10	ND	<10	<10	<10	<10
Arsenic	ug/g	ND	<5.0	<5.0	<5.0	<5.0	<5.0	ND	5.6	<5.0	5	<5.0
Barium	ug/g	ND	47.3	40.4	31.2	56.4	58.6	ND	223	147	113	174
Beryllium	ug/g	ND	<0.50	<0.50	<0.50	<0.50	<0.50	ND	0.52	<0.50	<0.50	<0.50
Boron	ug/g	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cadmium	ug/g	ND	<0.50	<0.50	<0.50	<0.50	<0.50	ND	<0.50	<0.50	<0.50	<0.50
Chromium	ug/g	ND	17.8	13.2	14.9	11.1	14.2	ND	20.5	16.2	22.4	22.5
Cobalt	ug/g	ND	3.2	2.3	2.5	2	3.1	ND	5.3	3.6	4.6	4.7
Copper	ug/g	ND	7.3	4.6	6	5.5	8.1	ND	11.6	6.9	14	11.1
Iron	ug/g	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Lead	ug/g	ND	<30	<30	<30	<30	<30	ND	<30	<30	<30	<30
Manganese	ug/g	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Molybdenum	ug/g	ND	<4.0	<4.0	<4.0	<4.0	<4.0	ND	<4.0	<4.0	<4.0	<4.0
Nickel	ug/g	ND	9.2	8.2	7.6	6	8.5	ND	13.7	8.8	12.4	13
Selenium	ug/g	ND	<3.0	<2.0	<2.0	<2.0	<3.0	ND	<2.0	<2.0	<3.0	<2.0
Silver	ug/g	ND	<2.0	<2.0	<2.0	<2.0	<2.0	ND	<2.0	<2.0	<2.0	<2.0
Strontium	ug/g	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Thallium	ug/g	ND	<1.0	<1.0	<1.0	<1.0	<1.0	ND	<1.0	<1.0	<1.0	<1.0
Tin	ug/g	ND	<5.0	<5.0	<5.0	<5.0	<5.0	ND	<5.0	<5.0	<5.0	<5.0
Titanium	ug/g	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Uranium	ug/g	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vanadium	ug/g	ND	16.1	12	12.5	13.4	14.8	ND	20.6	18.3	21.8	21.3
Zinc	ug/g	ND	14.1	10.5	12.2	10.3	14.3	ND	19.8	13.6	20.4	21.1
Moisture	%	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
pH	pH units	ND	6.18	6.25	5.46	5.77	7.49	ND	6.45	5.78	5.49	5.79
Lead-210	Bq/g	<0.02	ND	ND	<0.02	ND	<0.02	<0.02	ND	<0.02	ND	<0.02
Polonium-210	Bq/g	0.02	ND	ND	0.02	ND	0.01	0.01	ND	0.03	ND	0.03
Radium-226	Bq/g	0.02	ND	ND	0.02	ND	0.04	0.04	ND	0.04	ND	0.03
Thorium-230	Bq/g	0.03	ND	ND	0.02	ND	0.02	<0.02	ND	0.03	ND	0.05
Thorium-232	Bq/g	0.03	ND	ND	0.04	ND	0.06	0.05	ND	0.04	ND	0.05
Calcium	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloride	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Magnesium	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Potassium	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sodium	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sodium Absorption Ratio	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Specific conductivity	uS/cm	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sulfate	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Saturation	%	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

ND = No data

Attachment H Raw Chemis

Parameters	Units	2008 Mine LSA										
		AREVA KIGGAVIK K1G3 #5 SOIL	AREVA-KIGGAVIK KIG3 #1-5 COMPOSITE	AREVA-KIGGAVIK SIS2-1 SOIL	AREVA-KIGGAVIK SIS2-2 SOIL	AREVA-KIGGAVIK SIS2-3 SOIL	AREVA-KIGGAVIK SIS2-4 SOIL	AREVA-KIGGAVIK SIS2-5 SOIL	AREVA-KIGGAVIK SIS2 #1-5 COMPOSITE	AREVA-KIGGAVIK SIS3-1 SOIL	AREVA-KIGGAVIK SIS3-2 SOIL	AREVA-KIGGAVIK SIS3-3 SOIL
Mercury	ug/g	<0.0050	ND	0.0106	<0.0050	<0.0050	<0.0050	<0.0050	ND	<0.0050	<0.0050	<0.0050
Aluminum	ug/g	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Antimony	ug/g	<10	ND	<10	<10	<10	<10	<10	ND	<10	<10	<10
Arsenic	ug/g	6.2	ND	<5.0	<5.0	5	<5.0	<5.0	ND	<5.0	<5.0	<5.0
Barium	ug/g	215	ND	93.8	75.5	71	60.9	53.6	ND	49	45.8	34.4
Beryllium	ug/g	<0.50	ND	<0.50	<0.50	<0.50	<0.50	<0.50	ND	<0.50	<0.50	<0.50
Boron	ug/g	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cadmium	ug/g	<0.50	ND	<0.50	<0.50	<0.50	<0.50	<0.50	ND	<0.50	<0.50	<0.50
Chromium	ug/g	27.1	ND	21.8	28.2	23.6	19.5	18.6	ND	18.7	18.8	17.9
Cobalt	ug/g	6.1	ND	4.8	5.7	5.1	4.2	5.3	ND	4	5.3	4.4
Copper	ug/g	18.7	ND	7	7.7	7.6	7.9	8.3	ND	7.9	9.2	5.5
Iron	ug/g	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Lead	ug/g	<30	ND	<30	<30	<30	<30	<30	ND	<30	<30	<30
Manganese	ug/g	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Molybdenum	ug/g	<4.0	ND	<4.0	<4.0	<4.0	<4.0	<4.0	ND	<4.0	<4.0	<4.0
Nickel	ug/g	17.8	ND	13.1	17.6	15.6	12.2	11.8	ND	10.9	12.9	9.9
Selenium	ug/g	<2.0	ND	<2.0	<2.0	<2.0	<2.0	<2.0	ND	<2.0	<2.0	<2.0
Silver	ug/g	<2.0	ND	<2.0	<2.0	<2.0	<2.0	<2.0	ND	<2.0	<2.0	<2.0
Strontium	ug/g	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Thallium	ug/g	<1.0	ND	<1.0	<1.0	<1.0	<1.0	<1.0	ND	<1.0	<1.0	<1.0
Tin	ug/g	<5.0	ND	<5.0	<5.0	<5.0	<5.0	<5.0	ND	<5.0	<5.0	<5.0
Titanium	ug/g	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Uranium	ug/g	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vanadium	ug/g	23	ND	21	22.9	22.8	16.4	20.1	ND	16.4	16.9	16.2
Zinc	ug/g	23.8	ND	13.4	16.4	17.1	15	18.6	ND	15.3	15.5	14.2
Moisture	%	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
pH	pH units	7.82	ND	4.99	5.91	5.5	7.03	6.9	ND	7.63	7.28	5.98
Lead-210	Bq/g	ND	<0.02	<0.02	<0.02	ND	ND	ND	<0.02	ND	ND	ND
Polonium-210	Bq/g	ND	0.03	0.02	0.02	ND	ND	ND	0.02	ND	ND	ND
Radium-226	Bq/g	ND	0.04	0.02	0.01	ND	ND	ND	0.02	ND	ND	ND
Thorium-230	Bq/g	ND	0.03	0.02	<0.02	ND	ND	ND	0.04	ND	ND	ND
Thorium-232	Bq/g	ND	0.04	0.02	0.04	ND	ND	ND	0.03	ND	ND	ND
Calcium	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloride	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Magnesium	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Potassium	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sodium	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sodium Absorption Ratio	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Specific conductivity	uS/cm	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sulfate	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Saturation	%	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

ND = No data

Attachment H Raw Chemis

Parameters	Units	2008 Mine LSA										
		AREVA-KIGGAVIK SIS3-4 SOIL	AREVA-KIGGAVIK SIS3-5 SOIL	AREVA-KIGGAVIK SIS3 #1-5 COMPOSITE	AREVA-KIGGAVIK KIG1-1 SOIL	AREVA-KIGGAVIK KIG1-2 SOIL	AREVA-KIGGAVIK KIG1-3 SOIL	AREVA-KIGGAVIK KIG1-4 SOIL	AREVA-KIGGAVIK KIG1-5 SOIL	AREVA-KIGGAVIK KIG1 #1-5 COMPOSITE	AREVA-KIGGAVIK KIG2-1 SOIL	AREVA-KIGGAVIK KIG2-2 SOIL
Mercury	ug/g	<0.0050	0.0052	ND	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	ND	0.0201	<0.0050
Aluminum	ug/g	ND	ND	ND	-	-	-	-	-	ND	-	-
Antimony	ug/g	<10	<10	ND	<10	<10	<10	<10	<10	ND	<10	<10
Arsenic	ug/g	<5.0	6.9	ND	<5.0	<5.0	5.4	<5.0	<5.0	ND	<5.0	5.5
Barium	ug/g	30.2	97.5	ND	124	173	87.2	162	147	ND	295	212
Beryllium	ug/g	<0.50	<0.50	ND	<0.50	<0.50	<0.50	<0.50	<0.50	ND	0.6	<0.50
Boron	ug/g	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cadmium	ug/g	<0.50	<0.50	ND	<0.50	<0.50	<0.50	<0.50	<0.50	ND	<0.50	<0.50
Chromium	ug/g	16	25.6	ND	23.1	19.8	21.1	17.6	22.4	ND	17.6	20.9
Cobalt	ug/g	4.2	5.5	ND	5.6	5.1	6.8	3.8	5.1	ND	4.2	5.8
Copper	ug/g	5.3	19.4	ND	13.1	9.6	11.3	4.9	13.4	ND	14.1	12.1
Iron	ug/g	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Lead	ug/g	<30	<30	ND	<30	<30	<30	<30	<30	ND	<30	<30
Manganese	ug/g	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Molybdenum	ug/g	<4.0	<4.0	ND	<4.0	<4.0	<4.0	<4.0	<4.0	ND	<4.0	<4.0
Nickel	ug/g	8.8	15.7	ND	14	12.8	15.3	9.7	14.3	ND	13.3	13.3
Selenium	ug/g	<2.0	<2.0	ND	<2.0	<2.0	<2.0	<2.0	<2.0	ND	<2.0	<2.0
Silver	ug/g	<2.0	<2.0	ND	<2.0	<2.0	<2.0	<2.0	<2.0	ND	<2.0	<2.0
Strontium	ug/g	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Thallium	ug/g	<1.0	<1.0	ND	<1.0	<1.0	<1.0	<1.0	<1.0	ND	<1.0	<1.0
Tin	ug/g	<5.0	<5.0	ND	<5.0	<5.0	<5.0	<5.0	<5.0	ND	<5.0	<5.0
Titanium	ug/g	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Uranium	ug/g	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vanadium	ug/g	14.3	21.4	ND	21.8	18	20.9	17.8	20.3	ND	16.6	20.4
Zinc	ug/g	13.6	21.6	ND	27.3	19.6	29.9	15.2	24.3	ND	37.3	21.5
Moisture	%	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
pH	pH units	6.61	6.3	ND	5.29	6.37	5.38	5.45	5.42	ND	5.84	6.8
Lead-210	Bq/g	<0.02	0.02	<0.02	0.02	ND	ND	0.03	ND	0.04	ND	ND
Polonium-210	Bq/g	0.02	0.02	0.02	0.02	ND	ND	0.01	ND	0.02	ND	ND
Radium-226	Bq/g	0.02	0.02	<0.01	0.02	ND	ND	0.04	ND	0.03	ND	ND
Thorium-230	Bq/g	<0.02	0.05	0.02	0.02	ND	ND	<0.02	ND	0.04	ND	ND
Thorium-232	Bq/g	<0.02	0.04	0.04	0.04	ND	ND	<0.02	ND	0.05	ND	ND
Calcium	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloride	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Magnesium	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Potassium	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sodium	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sodium Absorption Ratio	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Specific conductivity	uS/cm	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sulfate	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Saturation	%	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

ND = No data

Attachment H Raw Chemis

Parameters	Units	2008 Mine LSA										
		AREVA-KIGGAVIK KIG2-3 SOIL	AREVA-KIGGAVIK KIG2-4 SOIL	AREVA-KIGGAVIK KIG2-5 SOIL	AREVA-KIGGAVIK KIG2 #1-5 COMPOSITE	AREVA-KIGGAVIK KIG4-1 SOIL	AREVA-KIGGAVIK KIG4-2 SOIL	AREVA-KIGGAVIK KIG4-3 SOIL	AREVA-KIGGAVIK KIG4-4 SOIL	AREVA-KIGGAVIK KIG4-5 SOIL	AREVA-KIGGAVIK KIG4 #1,3,4,5 COMPOSITE	AREVA-KIGGAVIK KIG4 #1,3,4,5 COMPOSITE
Mercury	ug/g	<0.0050	<0.0050	0.0252	ND	<0.0050	<0.0050	0.0055	<0.0050	<0.0050	ND	ND
Aluminum	ug/g	-	-	-	ND	-	-	-	-	ND	ND	ND
Antimony	ug/g	<10	<10	<10	ND	<10	<10	<10	<10	<10	ND	ND
Arsenic	ug/g	<5.0	<5.0	5.4	ND	5.2	5.6	6.1	<5.0	5.2	ND	ND
Barium	ug/g	168	104	323	ND	156	125	145	114	189	ND	ND
Beryllium	ug/g	<0.50	<0.50	0.66	ND	<0.50	<0.50	0.54	<0.50	<0.50	ND	ND
Boron	ug/g	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cadmium	ug/g	<0.50	<0.50	<0.50	ND	<0.50	<0.50	<0.50	<0.50	<0.50	ND	ND
Chromium	ug/g	16.5	22.8	15.4	ND	18.8	24.1	31.4	21.5	21.1	ND	ND
Cobalt	ug/g	4	4.7	3.2	ND	5.9	7.2	6.9	4.5	6.9	ND	ND
Copper	ug/g	5.6	6.6	16.6	ND	10.6	22.4	16.5	18	13.6	ND	ND
Iron	ug/g	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Lead	ug/g	<30	<30	<30	ND	<30	<30	<30	<30	<30	ND	ND
Manganese	ug/g	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Molybdenum	ug/g	<4.0	<4.0	<4.0	ND	<4.0	5.4	<4.0	5	<4.0	ND	ND
Nickel	ug/g	9.4	13.8	10.1	ND	11.7	16.5	17.5	12.9	14.9	ND	ND
Selenium	ug/g	<4.0	<2.0	<2.0	ND	<2.0	<2.0	<2.0	<2.0	<2.0	ND	ND
Silver	ug/g	<2.0	<2.0	<2.0	ND	<2.0	<2.0	<2.0	<2.0	<2.0	ND	ND
Strontium	ug/g	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Thallium	ug/g	<1.0	<1.0	<1.0	ND	<1.0	<1.0	<1.0	<1.0	<1.0	ND	ND
Tin	ug/g	<5.0	<5.0	<5.0	ND	<5.0	<5.0	<5.0	<5.0	<5.0	ND	ND
Titanium	ug/g	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Uranium	ug/g	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vanadium	ug/g	17.6	20.2	17.9	ND	21.3	24.5	29	22.6	22.9	ND	ND
Zinc	ug/g	13.5	19.7	11.3	ND	19.9	25.8	26	23.8	20.9	ND	ND
Moisture	%	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
pH	pH units	6.7	6.4	5.14	ND	5.88	6.01	5.2	4.95	6.45	ND	ND
Lead-210	Bq/g	<0.02	<0.02	ND	<0.02	ND	ND	0.07	0.05	ND	<0.02	<0.02
Polonium-210	Bq/g	0.02	0.02	ND	0.02	ND	ND	0.1	0.04	ND	0.04	0.04
Radium-226	Bq/g	0.02	0.03	ND	0.03	ND	ND	0.14	0.05	ND	0.07	0.07
Thorium-230	Bq/g	0.04	0.04	ND	0.02	ND	ND	0.13	0.04	ND	0.09	0.09
Thorium-232	Bq/g	0.04	0.05	ND	0.05	ND	ND	0.03	0.04	ND	0.04	0.04
Calcium	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloride	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Magnesium	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Potassium	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sodium	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sodium Absorption Ratio	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Specific conductivity	uS/cm	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sulfate	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Saturation	%	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

ND = No data

Attachment H Raw Chemis

Parameters	Units	2008 Mine LSA						2009 RSA			
		AREVA-KIGGAVIK KIG5-1 SOIL	AREVA-KIGGAVIK KIG5-2 SOIL	AREVA-KIGGAVIK KIG5-3 SOIL	AREVA-KIGGAVIK KIG5-4 SOIL	AREVA-KIGGAVIK KIG5-5 SOIL	AREVA-KIGGAVIK KIG5 #1-5 COMPOSITE	8/8/2009 KIGGAVIK REF-1 STATION-1	8/8/2009 KIGGAVIK REF-1 STATION-2	8/8/2009 KIGGAVIK REF-1 STATION-3	8/8/2009 KIGGAVIK REF-1 STATION-4
Mercury	ug/g	0.0075	<0.0050	<0.0050	<0.0050	<0.0050	ND	ND	ND	ND	ND
Aluminum	ug/g	ND	ND	ND	ND	ND	ND	6700	5400	7100	12700
Antimony	ug/g	<10	<10	<10	<10	<10	ND	<0.2	<0.2	<0.2	<0.2
Arsenic	ug/g	6.7	<5.0	5.8	6	13.6	ND	3.3	3.4	4.2	4.6
Barium	ug/g	162	69.3	121	111	157	ND	54	48	65	92
Beryllium	ug/g	0.54	<0.50	<0.50	<0.50	0.51	ND	0.3	0.3	0.3	0.5
Boron	ug/g	ND	ND	ND	ND	ND	ND	<1	<1	<1	48
Cadmium	ug/g	<0.50	<0.50	<0.50	<0.50	<0.50	ND	<0.1	<0.1	<0.1	<0.1
Chromium	ug/g	29	22.9	25.1	25.9	28.1	ND	11	6.8	17	8.5
Cobalt	ug/g	6.5	7.2	5.1	4.7	5.7	ND	3	2.7	3.7	4.1
Copper	ug/g	12.1	13.4	7	5.9	9.8	ND	3.9	3.5	6.4	5
Iron	ug/g	ND	ND	ND	ND	ND	ND	10300	9400	12000	11100
Lead	ug/g	<30	<30	<30	<30	<30	ND	5.1	4.1	6	5.2
Manganese	ug/g	ND	ND	ND	ND	ND	ND	83	96	95	140
Molybdenum	ug/g	<4.0	<4.0	<4.0	<4.0	<4.0	ND	0.2	0.2	0.2	0.3
Nickel	ug/g	19	19.9	15.4	15.1	16.8	ND	9	6.4	11	9.2
Selenium	ug/g	<2.0	<2.0	<2.0	<2.0	<2.0	ND	<0.1	<0.1	<0.1	<0.1
Silver	ug/g	<2.0	<2.0	<2.0	<2.0	<2.0	ND	<0.1	<0.1	<0.1	<0.1
Strontium	ug/g	ND	ND	ND	ND	ND	ND	71	67	73	100
Thallium	ug/g	<1.0	<1.0	<1.0	<1.0	<1.0	ND	<0.2	<0.2	<0.2	<0.2
Tin	ug/g	<5.0	<5.0	<5.0	<5.0	<5.0	ND	0.1	<0.1	<0.1	<0.1
Titanium	ug/g	ND	ND	ND	ND	ND	ND	220	210	310	380
Uranium	ug/g	ND	ND	ND	ND	ND	ND	1	0.9	2.2	0.9
Vanadium	ug/g	24.3	19.7	21.7	22.8	24.8	ND	16	13	20	20
Zinc	ug/g	23.3	24.1	16.6	16.5	18.6	ND	13	9.1	14	19
Moisture	%	ND	ND	ND	ND	ND	ND	11.17	14.34	12.97	12.49
pH	pH units	5.7	7.2	6.4	5.79	6.65	ND	ND	ND	ND	ND
Lead-210	Bq/g	ND	ND	<0.02	ND	<0.02	<0.02	<0.04	<0.04	<0.04	<0.04
Polonium-210	Bq/g	ND	ND	0.02	ND	0.02	0.03	0.02	0.02	0.03	<0.01
Radium-226	Bq/g	ND	ND	0.04	ND	0.02	0.02	0.04	0.03	0.04	<0.01
Thorium-230	Bq/g	ND	ND	0.05	ND	<0.02	0.03	0.02	<0.02	0.03	<0.02
Thorium-232	Bq/g	ND	ND	0.06	ND	0.04	0.03	0.03	0.04	0.04	0.04
Calcium	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloride	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Magnesium	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Potassium	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sodium	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sodium Absorption Ratio	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Specific conductivity	uS/cm	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sulfate	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Saturation	%	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

ND = No data