Kiggavik Project

Environmental Impact Statement

Tier 3 Technical Appendix 2N

Borrow Pits and Quarry Management Plan

December 2011

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1 INTRODUCTION

1.1 OVERVIEW

The AREVA Resources Canada Inc. (AREVA) Kiggavik Project (Project) is a proposed uranium ore mining and milling operation located in the Kivalliq region of Nunavut approximately 80 km west of the community of Baker Lake.

This document is a Technical Appendix to Volume 2, Project Description, of the Kiggavik Environment Impact Statement (EIS). This document includes the preliminary Borrow Pits and Quarry Management Plan (Plan) for the Project. The Plan will be in effect during the construction, operation, and decommissioning phases of the Project. The Plan will be made available to operational remote areas, the Project, AREVA's Baker Lake office and AREVA's corporate office.

The Plan applies to the Kiggavik Project sites, including the Kiggavik and Sissons areas, the access road from Baker Lake to the Project and the access road from the Kiggavik site to the Sissons site.

Approximately thirty potential bedrock quarries have been identified to provide rock and granular material for road construction. The final quarry sites will be based upon accessibility, haul distances, source material volume, extent of overburden, and absence of acid rock drainage (ARD) or metal leaching (ML) potential. Site development will include various excavation techniques such as drilling, crushing, and blasting. Proper engineering, site procedures, and compliance with the Plan will ensure sufficient environmental protection is in place.

1.2 PURPOSE AND SCOPE

AREVA developed the following Plan pursuant to the Nunavut Impact Review Board (NIRB) guidelines for the Project to mitigate potential environmental effects associated with the development of borrow pits and quarry sites. The purpose of the Plan is to provide objectives and measures to sustain and improve environmental performance throughout the life of the Project. AREVA will mitigate any negative environmental effects associated with the use of borrow pits and quarries during construction, operation, and decommissioning of the Project. The Plan will undergo regular review and be updated as indicated by incident investigation, regulatory change, management review, and when otherwise required.

1.3 REGULATORY GUIDELINES AND STANDARDS

Borrow pit or quarry development necessitates a quarry permit under the Territorial Quarrying Regulations, and potentially a land-use permit if activities include equipment that exceeds the threshold of applicable land use regulations. For extended tenure, a quarry lease is a more appropriate application that extends up to ten years of operation. Borrow pits and quarries on Inuit-Owned Land will require a Commercial Lease through the Kivalliq Inuit Association (KIA). Following issuance of a quarrying permit or lease, the Aboriginal Affairs and Northern Development Canada (AANDC) will enforce terms and conditions and conduct regular inspections.

If removal of granular resources from riverbeds or lakeshores is required, AREVA must obtain a water licence from the Nunavut Water Board (NWB) and approval from the Department of Fisheries and Oceans (DFO).

The Project also falls under the *Northwest Territories Waters Regulations,* where a Type B licence is required if deposit of waste in conjunction with quarrying below ordinary high water mark or deposit of waste with quarrying above ordinary high water mark where there is a direct or indirect deposit of waste to surface water.

Development of the Plan was strongly influenced by the AANDC, previously Indian and Northern Affairs Canada (INAC), *Northern Land Use Guidelines Pits and Quarries* (INAC, 2008).

Blasting operations require regulatory approval through the Worker's Safety and Compensation Commission (WSCC), and shall comply with the *Explosive Use Act and Regulations*.

The Project is also regulated by the *Mine Health and Safety Act and Regulations*.

AREVA will comply with the *Species at Risk Act* and associated regulations, specifically where AREVA is required to fence hazards such as sumps and pits. Further mitigation measures are outlined in section 4.2 Mitigation. Community engagement with local Inuit groups will be conducted prior to conducting land-use activities during the permitting process. As a permit holder, AREVA shall not survey, investigate, excavate or alter an archaeological site without consent of the land title holder.

Quarry returns will be reported monthly, and a final reclamation plan will be provided prior to cessation of operations. AREVA is committed to maintaining compliance and adhering to environmental commitments within the Plan and Environmental Policy.

2 CHARACTERIZATION

2.1 LOCATIONS

Material to be used for constructing road embankments should be either rock or granular material. However, there is minimal granular material of sufficient quality available along the route to consider using it as a source of fill. Most of the route has exposed bedrock of appropriate quality and quantity close to the alignment. The bedrock outcrops can be developed into suitable quarries for embankment fill material. Sources of granular material found along the route include till and alluvial deposits and Glaciofluvial outwash deposits are uncommon. Granular materials found in alluvial areas are often finer grained, ice-rich, and located in sensitive areas, in close proximity to water bodies, and are of small volume and relatively unmapped, so have not been considered as significant material sources. Glaciofluvial outwash deposits occur in the region, but are relatively infrequent and of minimal depth, so they also have not been considered as significant material sources.

The locations of 31 potential quarry sites along the proposed Baker Lake – Kiggavik and Sissons access roads were identified by EBA Engineering (see Technical Appendix 2G "Kiggavik to Sissons Access Road" and Technical Appendix 2L "All-Season Road Report").

The basic road building material used throughout the length of the road will be rock excavated from bedrock quarries situated at various locations along the route. The surface gravel will likely be 19 to 25 mm crushed gravel produced from the quarried rock, and will be placed in a layer approximately 300 mm thick.

The potential quarry locations are shown in Figure 2.1-1. A typical potential rock quarry site is shown in Figure 2.1-2. Table 2.1-1 contains a summary of the individual regional geologic units occupied by the proposed quarries. The table also contains a range of the anticipated ARD and ML potential based on the available geologic information for the rock units. From this table it can be seen that the majority of the rock that would be excavated from quarries along the proposed route are not anticipated to have a significant acid rock drainage (ARD) or metal leaching (ML) potential.

Figure 2.1-1 Quarry Site Locations

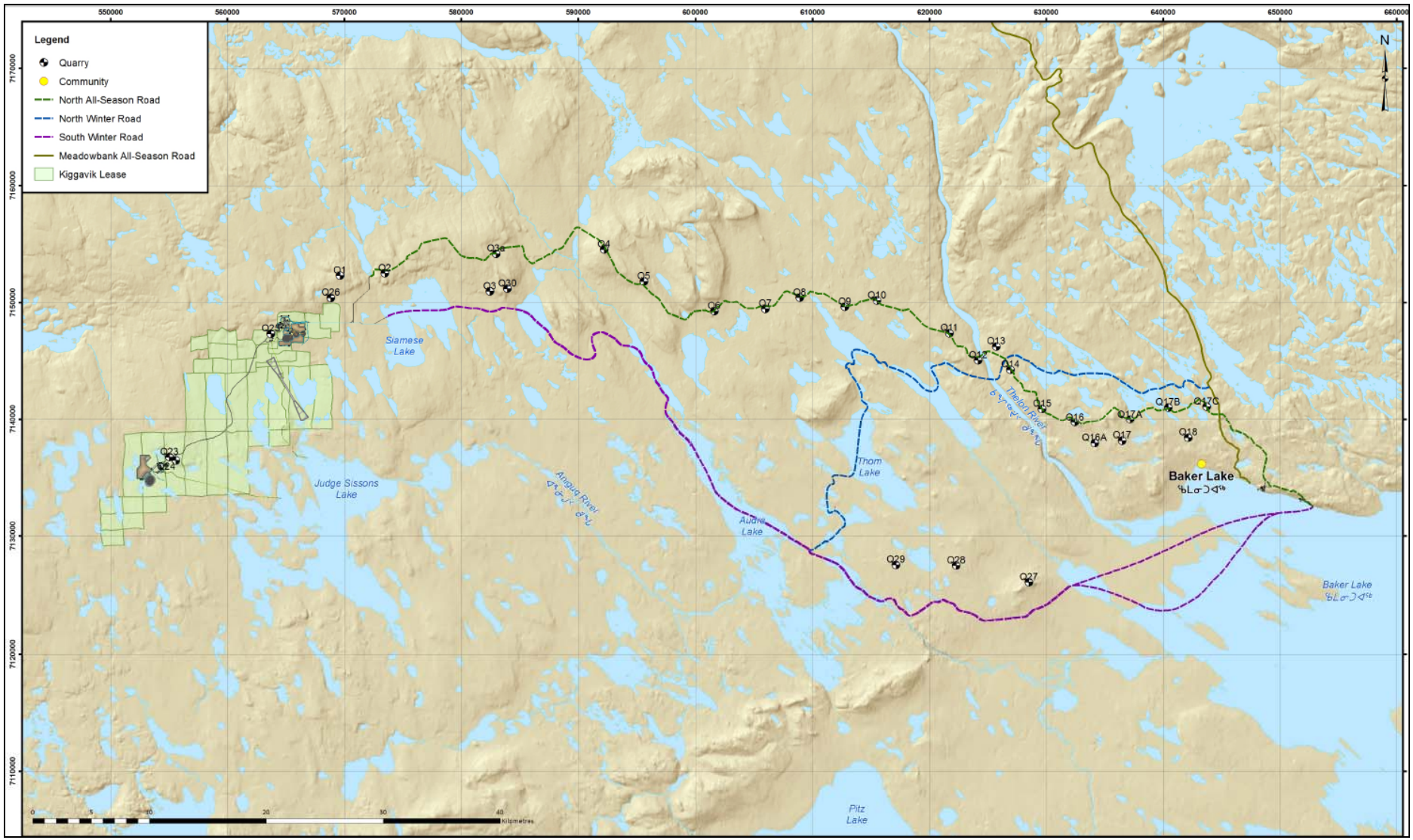

Figure 2.1-2 Typical Potential Rock Quarry Site

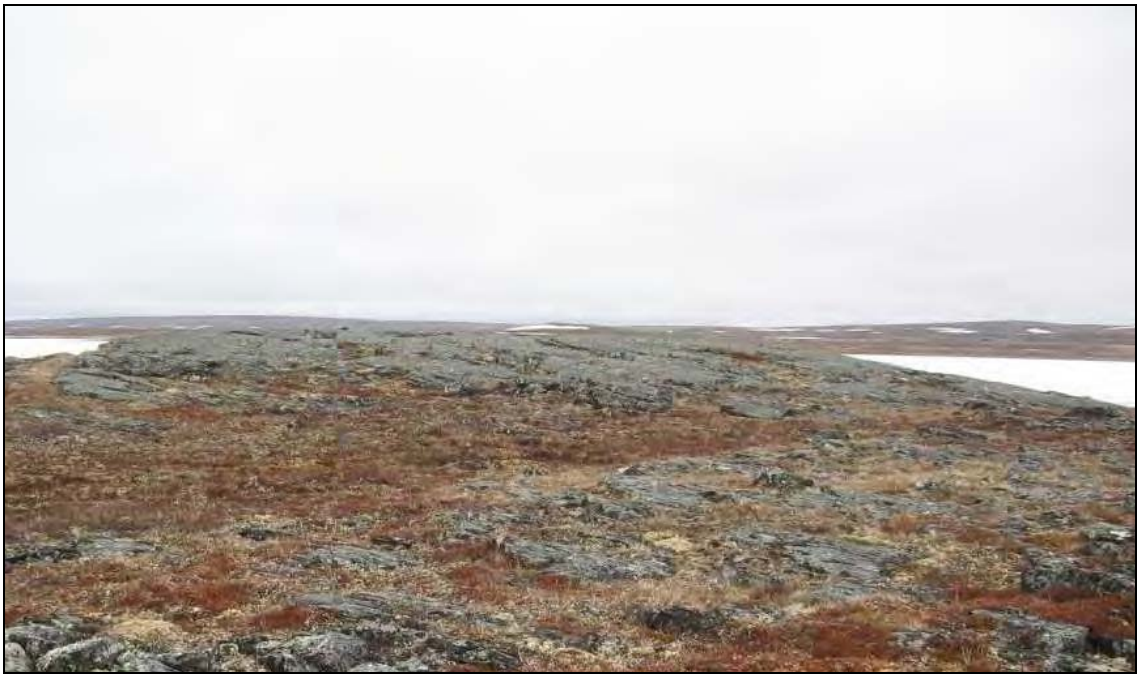

Table 2.1-1 Regional geological Mapping of Proposed Quarry Locations

Geologic Unit	Proposed Quarries within Unit	Anticipated Acid Rock Drainage Potential	Anticipated Metal Leaching Potential
PT: Thelon Formation; quartz arenite; crossstratified fluvial and eolian sandstones.	Q1, Q2, Q3, Q3A, Q24	None to Low	None to Low
Pwk: KetYet Group metawacke, flaggy to schistose, pervasive carbonate	Q4	None to Low	None to Low
Pqz: quartzite, locally crossbedded and rippled; white but locally hematitic	Q5, Q11	Low to High	None to Moderate.
Am: meta volcanic rocks; minor intermediate to felsic volcanic and volcaniclastic rocks, also undifferentiated meta sedimentary rocks; locally schistose.	Q6, Q7, Q8	**Volcanic rock:** Low to Moderate **Sedimentary rock:** None to Low	**Volcanic rock:** Low to Moderate **Sedimentary rock:** None to Low
Ag/Agcfz: un-subdivided granitoid rocks: granite, granodiorite, tonalite, minor diorite and gabbro: biotite + hornblende; medium to coarse grained; foliated to gneissic.	Q9, Q10, Q15, Q16, Q16A, Q17, Q17A, Q17B, Q17C, Q23	None to Low	None to Low
Atng: porphyritic to inequigranular granodiorite, tonalite and amphibolite; gneissic to layered.	Q12, Q13, Q14	Low to Moderate	Low to Moderate
Pbd: undifferentiated diabase or metagabbro dykes	Q18	None to Low	None to Low
Aqz: quartzite; massive to schistose.	Q25	Moderate to High	Low
Agn: gneiss (undifferentiated)	Q19, Q20, Q21, Q22	Low to Moderate	Low to Moderate

2.2 GEOCHEMICAL EVALUATION OF AGGREGATE SOURCES

EcoMetrix Incorporated (EcoMetrix) was retained by AREVA to complete an assessment of rock ARD and ML potential from identified quarry sites along the proposed Baker Lake – Kiggavik and Sissons access roads. During a site visit in July 2009, 33 rock samples from potential quarry sites were collected and submitted for Acid-Base Accounting (ABA) and metals content analysis. Each sample was also subjected to simplified Special Waste Extraction Procedure (SWEP) testing (see methodology in Technical Appendix 5F "Mine Rock Characterization and Management"). Complete results are provided in Attachment B and C.

Results of ABA and metals content analyses are summarized in Table 2.2-1 and suggest that the aggregate samples are non-acid generating, with paste pH values ranging from 6.1 to 9.4. The total sulphur contents of the aggregate samples is generally low and ranges from less than 0.01 to 0.12%, with a mean of 0.02%. Only 5 of the 33 samples have a sulphide contents above 0.05%. The AP values ranges from 0.3 to 3.8 kg-CaCO3/t with a mean of 0.53 kg-CaCO3/t. The mean NP value is about 12 kg-CaCO3/t, ranging from nil to 60 kg-CaCO3/t. The resulting NP/AP ratios average about 22, with all but one sample having a NP/AP ratio above 3. The rock sample collected from the potential quarry site Q23 has almost no NP, however the sulphide content is low at 0.01% and therefore does not pose a risk for acid generation.

The range in arsenic concentrations in the samples is small, with a geometric mean value of about 1.32 mg/kg. Concentrations are below 10 mg/kg in all samples except the sample from site Q7 that has an arsenic concentration of about 18 mg/kg. Uranium concentrations range between 0.1 and 4.1 mg/kg, with a mean value of about 0.8 mg/kg. Copper concentrations range between 1.2 and 153 mg/kg with a mean value of about 12 mg/kg. Mean concentrations of cadmium, cobalt, lead, molybdenum and zinc are about 0.04 mg/kg, 5.8 mg/kg, 9.4 mg/kg, 0.4 mg/kg and 30 mg/kg, respectively. Nickel concentrations generally range from 1.2 to 128 mg/kg, with a mean value of about 5.8 mg/kg while the concentration of antimony range from 0.05 to 1.2 mg/kg, with a mean concentration of 0.3 mg/kg.

The results of the SWEP testing are summarized in Table 2.2-2 as values of the equivalent mass of metals leached per mass of solids in units of mg/kg. The results are also presented as percentages of the original metal content. Leachate pH values are acidic, ranging from 3.4 to 7.7 with a mean value of 5.0. The mass of arsenic leached for the aggregate samples range from about 0.003 mg/kg to 0.2 mg/kg, with a mean leachable arsenic content of about 0.02 mg/kg. These masses represent a mean leachable fraction of less than 2% of the total arsenic inventory.

The mean leachable mass for copper is about 0.008 mg/kg representing less than 1% of the total copper inventory. Leachable masses for other metals of concern, including antimony, cadmium, cobalt, lead, molybdenum, nickel, uranium and zinc are generally below detection.

The results of these leach tests confirm that the potential aggregate rock materials are not likely to represent an issue with respect to leaching of constituents of potential concern.

Table 2.2-1 Summary of Metal Content and Acid Base Accounting for Proposed Quarry Material

Parameter	Units	10x Average Crustal Abundance[1]	Potential Quarry Material 33 Samples		
			Geomean	Minimum	Maximum
Arsenic (As)	mg/kg	10	1.32	0.20	18.3
Cadmium (Cd)[2]	mg/kg	1	0.04	<0.02	0.33
Cobalt (Co)	mg/kg	290	5.79	0.30	55.1
Copper (Cu)	mg/kg	750	12.2	1.20	153
Molybdenum (Mo)	mg/kg	10	0.36	0.08	1.97
Nickel (Ni)	mg/kg	1050	10.4	1.20	129
Lead (Pb)	mg/kg	80	9.36	1.40	193
Antimony (Sb)	mg/kg	2	0.26	0.05	1.17
Selenium (Se)	mg/kg	0.5	1.51	1.00	3.00
Uranium (U)	mg/kg	9.1	0.84	0.10	4.10
Zinc (Zn)	mg/kg	800	30.2	2.00	177
Paste pH	---	---	8.24	6.10	9.40
Neutralization Potential (NP)	kg-CaCO3/t	---	11.9	1.00	60.0
Acid Generating Potential (AP)	kg-CaCO3/t	---	0.53	<0.30	3.80
NP/AP	---	---	22.0	3.33	200
Total Sulphur	%	---	0.02	<0.01	0.12
Sulphate Sulphur	%	---	0.01	<0.01	0.07
Sulphide Sulphur	%	---	0.02	<0.01	0.11
Inorganic Carbon (C)	%	---	0.11	0.05	0.64
CO2	%	---	0.41	0.20	2.30

NOTES:

1 - From Faure, Gunter. 1998. Principles and Applications of Geochemistry. Prentice Hall. New Jersey.

2 - Detection limit varied for Cadmium

Table 2.2-2 Summary of Leachable Metal Concentrations from SWEP Testing of Proposed Quarry Material

Parameter	Units	Potential Quarry Material		
		Geomean	Minimum	Maximum
pH	---	4.99	3.42	7.72
Arsenic (As)	mg/kg	0.0160	<0.003	0.19
	%	1.21	<0.17	12.8
Cadmium (Cd)	mg/kg	<0.0003	<0.0003	<0.0003
	%	<0.7	<0.1	<1.6
Cobalt (Co)	mg/kg	0.002	<0.001	0.004
	%	0.027	<0.003	0.509
Copper (Cu)	mg/kg	0.008	<0.003	0.069
	%	0.069	0.013	0.434
Molybdenum (Mo)	mg/kg	0.003	<0.003	0.007
	%	0.872	<0.154	3.76
Nickel (Ni)	mg/kg	0.006	<0.006	0.012
	%	0.059	<0.005	0.509
Lead (Pb)	mg/kg	0.003	<0.003	0.004
	%	0.033	0.002	0.213
Antimony (Sb)	mg/kg	0.015	<0.015	0.016
	%	5.78	<1.305	30.6
Selenium (Se)	mg/kg	0.015	<0.015	0.016
	%	1.01	<0.507	1.55
Uranium (U)	mg/kg	0.015	<0.015	0.016
	%	1.81	<0.367	15.2
Zinc (Zn)	mg/kg	0.009	<0.009	0.015
	%	0.031	<0.005	0.458

NOTES:

% = percentage of total constituent inventory leached during SWEP testing

3 MANAGEMENT PLAN

Quarry selection was based on accessibility, haul distance, quarry size, topography, extent of overburden, absence of ARD and ML potential. AREVA previously evaluated source material and its effectiveness for development, and will continue to assess source material during construction. Material assessments will indicate type, extent of deposit, grade or quality, extent of permafrost or ground-ice, and structural and chemical properties. The following management practices will be employed for the duration of Project activity.

3.1 DEVELOPMENT

Prior to site development, a detailed plan will be produced to include the following:

Planning and Design

- consult regulatory authorities to determine permitting timelines and requirements
- conduct community engagement activities with local Inuit organizations
- determine duration of operation and resource estimates
- investigate site conditions and identify access routes
- perform or confirm archaeological survey
- develop mitigating procedures for intercepted archaeological sites, if any
- ensure sufficient operating space
- obtain surface and shallow-depth granular samples
- determine permafrost and ground-ice extent
- conduct geophysical surveys, if necessary
- designate fuel storage locations and appropriate containment
- ensure minimum of 30 m separation from sensitive environmental areas
- consider drainage patterns in design
- consider soil conservation, vegetation, and topography in design
- establish stockpiling locations
- estimate ARD and ML potential, including
    - develop mitigating procedures
    - establish reporting requirement
- submit final pit design to regulatory authorities

- develop procedures for operations, spill response, and safety
- establish water and waste management practices
- establish dust and noise control measures, including
    - orient pit walls to direct blast or operating noise from sensitive areas
    - construct berms or restrict operation times to reduce noise
    - apply dust suppression through watering, installing dust skirts, and minimize aggregate drop height where achievable
- verify reclamation required such as minimum overburden and vegetation

Site Development

- quarry site boundaries marked and cleared with minimal footprint
    - when achievable, ice-rich areas remain vegetated
    - vegetation salvaged for reclamation purposes
    - clearing activities avoided during sensitive nesting periods
- topsoil removed, covered, and stored for reclamation
    - organic layer stripped and separated from deeper mineral soil
- overburden segregated for future reclamation
    - removal must maintain ground stability
    - grade stockpiles to reduce erosion
    - locate stockpiles away from pit operations and surface runoff
    - ensure drainage of ground-ice melt waters are collected and treated when required

During site development, the project area will be prepared through stripping of overburden and vegetation, however quarry sites are dominated by exposed bedrock and support limited vegetation. During blast preparation, the contractor will space blasting dependant on rock fragmentation required. Typically a blast hole pattern between 2.5 m x 2.5 m and 3.5 m x 3.5 m is expected to produce approximately 20,000 m^3 of rock suitable for construction. Aggregate quarry production typically takes two weeks for rock blasting preparation.

Borrow site development utilizes conventional truck and loader operations to extract material. Loaders will fill buckets completely with granular material when loading the trucks for increased efficiency. Bulldozers may be used to create windrows of material for the loaders when the soil is thawed or unstable. Alternatively, the bulldozers may be required to extract material within the permafrost zone strongly bonded by ice. Alternating operation between extracting bonded material and creating windrows will allow sufficient aggregate thaw for efficient loading. Windrowed material will be approximately 2 to 3 m in height, and will vary in pit location

depending on ease of access and drainage. Quarry and borrow pit extraction will continue throughout the operation phase and follow the site development plan for each proposed location.

3.2 OPERATION PHASE

Processed aggregate will be used for roadway surfaces, roadway maintenance, concrete aggregate (sand), and coarse aggregate (stone). Aggregate processing will be limited as the majority of material removed from quarries may be utilized without crushing, screening, or washing. However a crusher will be used as required. Prior to operation, a detailed plan will be produced to include the following:

Operations

- verify associated permits required for duration of Project
- develop emergency and spill procedures
- regular review of site operating procedures as practices evolve
- establish site access and number of users
- signage and/or fences indicative of safety concerns
- swales or culverts installed to prevent water ponding
- excavation avoided below water table
- construct gentle pit slopes less prone to erosion
- inadvertent settling filled to restore natural drainage
- buffer strips to reduce noise, prevent sedimentation, and provide visual barrier
    - vegetation buffer strips of 100 m width around water bodies
    - visual buffers of 30 m recommended between road and pit
- excavated material containing ground-ice handled as per the following water management section
- granular material processing will include crushers, screens, wash plants, generators and conveyors
    - pits designed for ease of haul access
    - locate crusher on stable ground for heavy equipment support
    - washing of granular materials may be necessary; water licence may be required
    - frozen material should be crushed prior to screening
    - inadequate granular material stored for future reclamation

Pit and Quarry development is dependant on seasonal timing. Frozen-ground minimizes land disturbance and maximizes transportation efficiency, consequently restricting optimal development times to winter months. The following are recommendations from the *Northern Land Use Guidelines Pits and Quarries* (INAC 2008).

Exploration:

- Access preferable in winter, but field programs favour summer

Access and Transportation:

- Requires winter access roads unless all-season road constructed

Operations and Processing

- favourable in summer; however permafrost conditions may limit activity to winter
- operations may cease during spring break-up
- washing during summer months
- potential operational limits during critical life stages for birds, mammals, and fish

Sediment, dust, and erosion control will be implemented throughout the life of the Project. As indicated, swales, culverts, gentle slopes, vegetative buffers, seasonal operation, and erosion control products will be employed to reduce the Project effects.

3.3 CLOSURE

A detailed reclamation plan will be developed as required by the land-use permit or lease. The plan will be developed in conjunction with the site development plan to be incorporated into the design. Reclamation objectives are developed according to regulatory authorities and stakeholder expectations, site conditions, and future land use. Following approval of a reclamation plan, progressive reclamation may commence during operations. A progressive approach will reduce total reclamation required and final closure costs. Following operation completion, all buildings, machinery, and fuel containers will be disposed of in an appropriate facility. Garbage, blasting material, and stockpiles will be removed from site. The pit or quarry will be backfilled, contoured, and reclaimed once extraction is complete. Following regulator approval of site stability, a letter of final clearance will indicate AREVA is no longer responsible for the pit or quarry site.

Reclamation

- remove all foreign material (e.g., debris, structures, or equipment)
- in absence of permafrost flood pits may be discussed with regulators
- bury coarse material within pit or utilize for slope reconstruction
- avoid using ice rich materials
- recontour and grade overburden to eliminate stockpiles

    - contours should not disrupt drainage
- reconstruct slopes to restore natural drainage
    - drainage ditches maintain grade and capacity for diverting runoff from reclaimed site to aid vegetation establishment
    - rip-rap, boulders, or roughening soil surface to slow erosion
- restore topsoil and initiate revegetation
    - spread topsoil evenly over disturbed area
    - roughen surface to provide micro-sites for revegetation
    - natural revegetation optimizes native species and prevents invasive plants
- Where cliff faces exist, access restricted and safety signs installed
- reclaim access roads

3.4 WATER MANAGEMENT

The water management associated with pits and quarries is essential to prevent permafrost degradation and negative effects to the environment. Water from within pits or quarries will not be released to surface waters without regulatory approval. To reduce ponding and resulting permafrost degradation, drainage ditches or channels will be installed to divert water. To avoid sedimentation in surrounding water bodies, settling ponds or impoundments will be constructed where necessary. Where water erosion may cause slope destabilization, erosion control products will be available (e.g., geotextiles, rip-rap, straw blankets).

Thawing of ice-rich permafrost or ground-ice makes topography susceptible to slumping from pit and quarry operations and necessitates additional water management. Mitigating measures will be in place to prevent permafrost degradation, or an alternate location considered to prevent disturbance to permafrost. Drainage will be collected in a sump, and if required, will undergo testing prior to release. To prevent erosion and sediment transport, side slopes will be 1H:1V to 2H:1V, to resemble natural topography. Berms and silt fences may be utilized to control any excess runoff from the pit.

Material characterization (see section 2) indicates that the majority of excavated rock would not have significant ARD or ML potential. The aggregate rock materials are not likely to leach constituents of potential concern. However construction procedures will ensure only clean (ARD/ML free) is placed where drainage has the potential to enter fish bearing streams. Roadway fills along the proposed alignment are not within drainage pathways to fish bearing streams, but through continued monitoring and periodic rock analysis AREVA will ensure the water sources are protected from ARD and ML.

4 MONITORING

Project monitoring will evaluate consistency with the Plan, and operational compliance with regulation, leases, and permits. Monitoring will ensure site preparation measures are meeting goals, water management is effective, pit walls are stable, and granular material remains suitable for use. Permafrost and ground-ice extent, change in material following thaw, and wildlife sightings or interactions will be recorded to aid in revisions to the Plan and mitigating measures. Inspection of site safety, general housekeeping, drainage, and erosion control will ensure compliance with the Plan.

4.1 ENVIRONMENTAL MONITORING

Monitoring site development, operations, and reclamation will ensure appropriate company performance and provide valuable data for environmental management. Water management practices primarily consist of monitoring and sample analysis, especially when verifying absence of ARD or ML. Melt waters will be monitored in accordance with the Canadian Council of Ministers of the Environment (CCME) Guidelines. Wildlife such as caribou and species at risk will continually be monitored to prevent disturbances. Bird species at risk will not be disturbed when nesting within pit or quarry walls. Any nest destruction or bird mortality must be immediately reported to the Nunavut Wildlife Officer. Wildlife listed within the *Species at Risk Act* is of special concern, and will be monitoring and avoided during operations. Quarry and pit stability will be assessed to employ contingencies when required. Site monitoring will be conducted to assess the effectiveness of reclamation, and will be outlined in the land use permit. Monitoring of reclamation success will focus on vegetation reestablishment, erosion control, and water within pits and quarries. As per the Metal Mining Effluent Regulations (MMER), AREVA will ensure compliance through guidance of Table 4.1-1.

Table 4.1-1 Authorized Limits of Deleterious Substances

Item	Deleterious Substance	Maximum Authorized Monthly Mean Concentration	Maximum Authorized Concentration in a Composite Sample	Maximum Authorized Concentration in a Grab Sample
1.	Arsenic	0.50 mg/L	0.75 mg/L	1.00 mg/L
2.	Copper	0.30 mg/L	0.45 mg/L	0.60 mg/L
3.	Cyanide	1.00 mg/L	1.50 mg/L	2.00 mg/L
4.	Lead	0.20 mg/L	0.30 mg/L	0.40 mg/L
5.	Nickel	0.50 mg/L	0.75 mg/L	1.00 mg/L
6.	Zinc	0.50 mg/L	0.75 mg/L	1.00 mg/L
7.	Total Suspended Solids	15.00 mg/L	22.50 mg/L	30.00 mg/L
8.	Radium 226	0.37 Bq/L	0.74 Bq/L	1.11 Bq/L

Source: *Metal Mining Effluent Regulations* (MMER, 2011)
NOTE: All concentrations are total values.

4.2 MITIGATION

Mitigation techniques to be employed during the construction and operation of borrow and quarry pits will follow the guidelines set out in the *Northern Land Use Guidelines Pits and Quarries* (INAC 2008) in Table 4.2-1.

To minimize the borrow pits required, mine rock Type 1 (see Technical Appendix 5F “Mine Rock Characterization and Management”) will be utilized to the greatest extent practical to conserve glacio-fluvial outwash and esker landforms.

Potential measures to limit wildlife disturbance may include ceasing operation during sensitive migration and/or breeding periods, noise minimization, proper waste disposal to minimize wildlife attractants, and proper water management to avoid sedimentation in fish bearing lakes. Further mitigation measures related to Project activities and wildlife are outlined within the Technical Appendix 6D “Wildlife Mitigation and Monitoring”

To minimize noise effects pit walls will be constructed to direct blasting and operating noise from sensitive areas. Machinery and equipment will undergo regular inspection to eliminate any excess emissions and noise. Conveyor, crusher, and haul trucks may be equipped with dust skirts to aid in dust suppression during transfer of granular material. Watering of roads or areas exposed to wind erosion will reduce erosion and airborne dust particles. Topsoil will be

recovered following site development to prevent wind dispersion and loss of salvageable reclamation material.

The Project access roads were examined during archaeological studies for the Kiggavik project (See Technical Appendix 9B “Archaeology Baseline”). Additional surveys will be completed prior to development of new quarry sites. In the event suspected archaeological remains are discovered, AREVA will notify the Department of Culture, Language, Elders and Youth (CLEY) – Government of Nunavut and the land resource officer. Mitigation techniques to be employed during the construction and operation of borrow and quarry pits will follow the guidelines set out in the *Northern Land Use Guidelines Pits and Quarries* (INAC 2008) in the following table.

Spill mitigation measures are outlined within the Technical Appendix 10 B “Spill Contingency and Landfarm Management Plan”.

Table 4.2-1 Pit and Quarry Environmental Concerns and Mitigation Techniques

Development Phase	Activities	Potential Environmental Effects	Mitigation Techniques
site layout / site preparation	• vegetation removal • soil and overburden removal	• soil erosion • habitat loss	• retain vegetation to maintain slope stability • maintain natural drainage patterns • maintain vegetation buffer zones to protect water bodies • construct ditches to direct runoff away from site • locate the development in a well drained area • salvage and properly store organics, topsoil, and overburden for use in reclamation
operations / monitoring	• blasting • stockpiling • crushing • access road maintenance	• soil erosion and sediment deposition	• limit sediment movement using silt fences or straw bales • use rip-rap to reinforce drainage channel corners and water discharge points • revegetate where required to stabilize slopes
		• water quality impacts: • silt • fuel • blasting residue	• limit sediment movement or use settling ponds before discharging • use proper fuel containment and handling techniques, and have spill kits accessible • use proper explosives handling techniques to minimize wastage
		• water ponding: • permafrost degradation	• minimize sources of in-pit water by diverting surface water away from the development area • place ice-rich material to thaw in a location where melt water will not re-enter pit • limit pit or quarry depth
		• dust generation	• spray water and use dust skirts on conveyors to minimize dust

Source: *Northern Land Use Guidelines Pits and Quarries* (INAC 2008)

5 REPORTING

Throughout the life of the Project, and following reclamation, AREVA remains committed to maintaining compliance with regulatory commitments and measures described within the Plan. Subsequent reporting will provide detailed monitoring results and accessible Project information for interested parties. Community engagement will be ongoing, and reports will encompass all aspects of the Project. Any wildlife interactions during quarry operations will be immediately reported to the Nunavut Wildlife Officer. Discovery of archaeological remains and related actions will be reported to the CLEY and Land Resource Officer. Quarry and land-use permits necessitate monthly reports to summarize quarry returns. The AANDC, WSCC, and KIA inspections will be summarized within annual reports to demonstrate compliance with conditions outlined in operating permits and lease agreements.

6 SUMMARY

Through site development planning, monitoring, and implementation of mitigation measures when required, AREVA will maintain compliance with company standards, regulatory permits and authorizations through the life of the Project. Potential for negative impacts will effectively be reduced through proper planning and implementation of the Plan. Monitoring and mitigation will be in place at the Project site, along the access roads. Initial planning will incorporate company best practices and related technologies for efficiency and environmental protection. Progressive reclamation and adoption of improved technologies will facilitate acceptable closure. AREVA is committed to continual environmental improvement through all aspects of operation. The Plan will undergo regular management review to assess effectiveness both operationally and environmentally.

7 REFERENCES

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8 GLOSSARY

archaeological site	Site or work within the Nunavut Settlement Area of archaeological, ethnographical or historical importance, interest or significance or a place where an archaeological specimen is found, and includes explorers' cairns
borrow pit	Excavation of low-quality fill, such as silt, clay and topsoil. Material is usually removed for use at a nearby site.
buffer strip	An area of land that is left untouched to provide a natural barrier between a development and an adjacent area. Buffers can be used to protect important ecosystem components such as wildlife habitat or water bodies, or they can be used to provide a visual barrier between the development and an area of human use.
dust skirt	A sheet that surrounds the outlet of a crusher to contain and minimize dust emissions.
granular resources	Materials ranging from silts to sands, gravel and cobbles that can be used for a wide variety of construction purposes.
ground-ice	Ice present in ground materials that dominates the geotechnical properties, and can cause terrain instability if thawed.
interburden	Waste material encountered within the granular resource.
overburden	Rock or soil of little or no value that is located above the desired granular deposit, and must be removed prior to quarrying.
permafrost	Ground that is frozen for at least two consecutive years. Continuous permafrost is defined as an area where at least 90% of the land area is underlain by permafrost, while in discontinuous permafrost, between 10 to 90% of the land is underlain by permafrost.
pit	Excavation that is open to the air, and any associated infrastructure that is operated for the purpose of extracting sand, clay, marl, earth, shale, gravel, unconsolidated rock, or other unconsolidated materials, but not bitumen.
progressive reclamation	Actions that can be taken during operations before permanent closure to take advantage of cost and operating efficiencies by using the resources available from ongoing operations. It enhances environmental protection and shortens the timeframe for achieving the reclamation objectives.
quarry	Excavation that is open to the air and associated infrastructure that is operated for working, recovering or extracting rock materials by digging, cutting or blasting. Quarries usually yield large stone that may then be crushed. Commonly quarried materials include limestone, granite, sandstone, dolostone, marble, or other consolidated rock.
sand or gravel pit	Extraction of unconsolidated earth materials, such as sand or gravel by digging a pit.
windrow	Granular material piled into a long, continuous row.

Source: *Northern Land Use Guidelines Pits and Quarries*. (INAC 2008)

Attachment A Potential Quarry Sites

Headings	Y_UTM83	X_UTM83	Outcrop Size	Relief	Overburden Thickness	Overburden Type	Rock Structure
Q1	7,152,296	569,611	1km x 500m	9m	0-0.2m	till	block, jointed in steps .3 to 1m tall
Q2	7,152,497	573,460	200m x 100m	20m	none	none	solid with minimal fractures
Q3	7,150,953	582,450	250m x 150m	12m	0-0.3m , 50%	till, gravel and	solid
Q3a	7,154,168	582,966	130m x 50m	5-7m	0-.5m, 60%	till, gravel and	fractures, cracking in exposed areas
Q4	7,154,534	592,218	extends for km in length 1km across	12m	none	none	broken rock, many fractures where exposed
Q5	7,151,802	595,620	100m x 350m	15m+	0m-0.2m,	till	solid, parallel lines on surface
Q6	7,149,269	601,558	100x100	8-9m	0-0.2m, 10%	thin till	minimal fractures, solid
Q7	7,149,463	605,945	100m x 60m	6-7m	50% ob, 0-	till	smooth, solid
Q8	7,150,419	608,894	300m x 120m	26m	50% ob, 0-	till	smooth with some small cracks
Q9	7,149,630	612,751	350 x 200m	12m+	minimal	some broken	minimal fractures, smooth and broken rock at surface
Q10	7,150,167	615,476	190m x 100m	20m	0-0.2m, 10%	till and some	some small visible fractures
Q11	7,147,387	621,693	230m x 80m	5m	0-0.5m, 30%	till	smooth with some fractures and cracking
Q12	7,145,056	624,160	200m x 70m	10m	0-0.3m, 15%	till	smooth with some fractures and cracking
Q13	7,146,238	625,694	300m x 300m	20m	0- 0.5m, 20%	till	Smooth, minimal fractures
Q14	7,144,255	626,916	500 x 200m	10m	0-0.5m, 40%	till	Smooth, minimal fractures
Q15	7,140,904	629,612	100m x 170m	10m	0-0.3m, 30%	till	Smooth, minimal fractures, and shattered rock
Q16	7,139,721	632,427	250 x 250m	15m	0-0.2m, 20%	till	smooth with minimal fractures
Q16A	7,137,930	634,129	140m x 180m	3m	0-0.3m, 30%	till	smooth with a few shallow fractures
Q17	7,138,142	636,456	100mx 130m	10m	0-0.5m, 40%	till	visible fractures and shattered rock
Q17A	7,139,983	637,158	300m x 150m	9m	0-0.3m, 25%	till	smooth some fractures
Q17B	7,141,029	640,436	100m x 50m	6m	0-0.3m, 20%	till	smooth with a few shallow fractures
Q17C	7,141,092	643,710	150m x 80m	8m	minimal	till	smooth with a few shallow fractures
Q18	7,138,389	642,133	200x 300m	12m	0-0.2m, 10%	till	smooth with some fractures
Q19	7,133,164	360,790	100m x 50m	10m	0-0.5m, 30%	gravel, broken	smooth with minimal fractures
Q20	7,132,996	361,203	150m x 250m	10m	0-0.5m, 30%	till and broken	blocky and jointed
Q21	7,132,132	362,651	150m x 200m	15m	0-0.3m, 40%	gravel, till and	smooth with striations where visible
Q22	7,131,929	363,681	200m x 500m	30m	0-0.3m, 40%	gravel, till and	smooth with striations where visible
Q23	7,136,725	555,021	50m x 50m	3m	0m-0.75m,	till and gravel	solid, no visible fractures
Q24	7,136,455	555,557	350m x 80m	12m	0m-0.75m,	till and gravel	solid, no visible fractures
Q25	7,147,330	563,707	50m x 100m	8m	0m-0.75m,	till and gravel	solid, no visible fractures
Q26	7,150,404	568,829	3km x 350m	30m	0-1m, 60%	till and gravel	solid, with minimal fractures

Attachment B – Solids Analysis Results

		Aggregate Q1A	Aggregate Q1B	Aggregate Q2	Aggregate Q3	Aggregate Q3A	Aggregate Q4	Aggregate Q5	Aggregate Q6	Aggregate Q7	Aggregate Q8	Aggregate Q9	Aggregate Q10	Aggregate Q11	Aggregate Q12	Aggregate Q13	Aggregate Q14	Aggregate Q15	Aggregate Q16	Aggregate Q16A
Metals																				
Aluminum (Al)	%	4.29	1.56	3.39	1.08	3.75	5.47	5.95	8.96	7.61	8.46	7.56	8.48	8.25	8.76	7.71	7.77	7.59	7.37	7.68
Antimony (Sb)	mg/kg	0.24	0.27	0.63	0.19	0.46	0.51	0.47	1.17	0.64	0.77	0.94	0.76	0.16	0.5	0.45	0.21	0.36	0.28	0.33
Arsenic (As)	mg/kg	3.5	3.9	3.5	1.5	5	9.9	4.3	1.5	18.3	4.7	0.9	1.1	0.2	7.1	2.7	5.2	0.4	0.2	0.4
Barium (Ba)	mg/kg	360	80	130	70	320	460	540	350	330	90	820	520	810	410	640	840	1720	860	940
Beryllium (Be)	mg/kg	0.87	0.52	2.08	0.71	1.92	1.01	1.1	0.84	0.73	0.33	0.73	0.9	1.54	1.24	1.45	1.82	1.12	1.91	2.14
Bismuth (Bi)	mg/kg	0.14	0.14	0.14	0.04	0.14	0.23	0.1	0.02	0.33	0.06	0.02	0.02	0.03	0.44	0.99	4.14	0.11	0.09	0.05
Cadmium (Cd)	mg/kg	<0.02	<0.02	<0.02	<0.02	0.06	<0.02	<0.02	0.08	0.33	0.13	0.06	0.07	0.02	0.13	0.08	0.12	0.06	0.12	0.09
Calcium (Ca)	%	0.53	0.03	0.04	0.02	0.51	0.23	0.01	3.26	4.53	9.14	2.14	4.1	1.25	4.17	1.89	1.87	3.79	0.59	1.48
Cerium (Ce)	mg/kg	45.2	35.4	27	8.11	32.2	74	84.8	52	37.2	13.8	59.4	74.5	35.3	87.1	44.2	51.9	96.6	95.9	61.4
Cesium (Cs)	mg/kg	0.66	0.36	1.96	0.58	3.61	1.67	1.49	1.93	0.78	0.18	1.74	0.84	0.74	0.64	3.56	1.79	0.68	1.21	0.96
Chromium (Cr)	mg/kg	25	30	25	22	26	35	43	103	75	216	15	63	8	50	24	14	59	12	8
Cobalt (Co)	mg/kg	3.9	1.2	1.2	0.8	3.2	3.9	1.8	55.1	25.9	45.6	12.1	22.1	7.4	27.6	4.8	9.6	16.5	4.5	5.8
Copper (Cu)	mg/kg	9.6	3.2	6.1	3.1	12.8	27.3	2.7	65.6	71.5	93.6	13.9	13	6.3	18.6	153	39	5.1	5.9	9.4
Gallium (Ga)	mg/kg	10.4	4.46	13	2.88	18.5	12.9	15.1	26.9	22.4	18.95	20.7	25.2	25.5	26.6	24	21.9	24.8	22.6	23.2
Germanium (Ge)	mg/kg	0.09	0.08	0.07	0.05	0.08	0.1	0.09	0.2	0.15	0.16	0.15	0.16	0.12	0.23	0.14	0.13	0.2	0.14	0.13
Hafnium (Hf)	mg/kg	3.4	1.9	4.1	0.3	1.6	2.9	3.7	5.2	2.2	0.5	1.9	2.8	3.1	1.6	3.9	2.7	2.2	4.9	3.2
Indium (In)	mg/kg	0.012	<0.005	0.016	<0.005	0.011	0.011	0.014	0.119	0.763	0.076	0.026	0.072	0.032	0.143	0.317	0.042	0.046	0.02	0.072
Iron (Fe)	%	2.02	1.42	1.9	0.63	1.96	0.81	0.78	10.95	5.5	7.8	3.14	5.13	2.49	7.32	5.31	3.33	3.65	1.76	2.45
Lanthanum (La)	mg/kg	25.9	18.6	14.7	4.3	17	46.1	52.7	23.7	19.9	5.8	31.1	40	15.2	41	23.5	25.9	49.3	51	28.7
Lead (Pb)	mg/kg	7.1	6.8	6	1.4	6.3	6.4	4	4.2	11.3	3.1	6.4	11.4	6.1	10.2	8.6	65.8	13.7	16.5	192.5
Lithium (Li)	mg/kg	19.9	18.1	39.8	43.4	52.9	6.7	5.2	58.1	20.5	15	16.5	27.4	9.3	22.3	20.7	11.1	14.9	7.9	11.8
Magnesium (Mg)	%	0.28	0.04	0.1	0.06	0.14	0.1	0.08	4.06	2.33	3.69	1.06	1.96	0.99	3.02	1.31	0.95	1.84	0.51	0.51
Manganese (Mn)	mg/kg	170	60	80	44	109	67	32	1540	802	1620	498	773	402	1380	566	987	583	333	511
Molybdenum (Mo)	mg/kg	1.54	1.38	1.68	0.46	0.41	0.62	0.33	0.91	1.97	0.32	0.13	0.2	0.1	0.08	0.92	1.77	0.13	0.18	0.42
Nickel (Ni)	mg/kg	9.9	4	3.8	3.7	7	8.8	14.4	97.4	64.8	128.5	12	61.1	8.4	32.1	6.6	11.6	37.5	7.4	3.4
Niobium (Nb)	mg/kg	5.9	3.3	6.8	0.7	3.2	2.9	3.5	10.6	6.3	3.1	3	3.7	8	5.6	7.3	5.2	4.1	11.1	11.9
Phosphorous (P)	mg/kg	280	220	170	70	2340	180	100	1510	390	360	800	1240	580	1280	1290	800	1220	520	560
Potassium (K)	%	1.01	0.44	1.36	0.48	1.01	2.13	2.81	0.74	0.88	0.23	1.44	0.63	1.8	1.33	2.04	2.07	1.93	3.38	2.19
Rhenium (Re)	mg/kg	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Rubidium (Rb)	mg/kg	37.7	12.8	46.2	22.7	61.7	100.5	114.5	20.1	33.3	6.7	33.6	9.4	50.7	49.5	159.5	129	43.9	168	86.8
Scandium (Sc)	mg/kg	3.8	1	3.7	1.2	4.3	2.3	2.9	36.2	20.7	41.5	7.7	16.2	6.4	27.6	11.4	10	11.2	4.5	9.9
Selenium (Se)	mg/kg	2	1	1	1	1	1	1	2	3	2	1	1	2	2	2	2	2	2	2
Silver (Ag)	mg/kg	0.04	0.04	0.02	0.04	0.03	0.07	0.08	0.05	0.29	0.07	0.02	0.05	0.01	0.05	0.53	0.29	0.04	<0.01	0.16
Sodium (Na)	%	0.98	0.02	0.03	0.01	0.02	0.5	0.05	2.28	2.03	1.94	3.36	3.73	3.58	2.76	2.45	2.64	2.7	2.96	3.57
Strontium (Sr)	mg/kg	206	220	107.5	77.5	183.5	153.5	69.9	319	312	208	446	996	394	686	361	276	1285	280	572
Sulphur (S)	%	0.03	0.01	<0.01	<0.01	<0.01	0.01	<0.01	0.16	0.05	0.1	0.02	0.03	<0.01	0.12	0.13	0.12	<0.01	<0.01	0.03
Tantalum (Ta)	mg/kg	0.55	0.47	0.55	0.05	0.23	0.3	0.32	0.64	0.48	0.22	0.18	0.12	0.65	0.19	0.7	0.27	0.16	0.93	1.42
Tellurium (Te)	mg/kg	<0.05	<0.05	0.09	<0.05	0.06	<0.05	<0.05	0.08	0.12	<0.05	<0.05	<0.05	<0.05	<0.05	0.23	0.06	<0.05	<0.05	0.06
Thallium (Tl)	mg/kg	0.18	0.06	0.18	0.11	0.24	0.45	0.6	0.15	0.17	0.08	0.19	0.1	0.24	0.4	1.08	0.68	0.22	0.72	0.51
Thorium (Th)	mg/kg	10.9	7.2	9.9	3.2	6.7	19.3	16.9	2	8.9	0.5	3.9	4.2	6.3	3.9	11.1	5.9	3.9	21.9	17.5
Tin (Sn)	mg/kg	0.7	0.4	1.6	0.2	0.5	0.7	0.8	1.7	3.3	0.7	0.6	1.4	1.3	5.2	10.3	2.1	1	1.5	1.7
Titanium (Ti)	%	0.149	0.054	0.139	0.021	0.141	0.098	0.139	1.39	0.378	0.55	0.251	0.414	0.216	0.5	0.378	0.294	0.31	0.205	0.24
Tungsten (W)	mg/kg	1.4	0.7	6.9	0.4	5.4	1.2	1.4	0.2	0.3	0.2	0.3	0.7	0.1	1.2	4.6	2.5	0.7	0.3	1.2
Uranium (U)	mg/kg	1.3	0.6	1.7	0.4	4.1	1.3	2.5	0.4	1.5	0.1	0.2	0.3	1.7	0.7	2	0.7	0.7	2.7	2.8
Vanadium (V)	mg/kg	35	20	11	10	23	20	27	275	140	265	76	108	50	185	85	59	96	25	38
Yttrium (Y)	mg/kg	5.6	2.2	11.9	1	5.1	4.4	5.6	35.9	18.1	19.4	7.3	9.2	8.4	25.1	11.6	11.1	10.8	12	21.3
Zinc (Zn)	mg/kg	18	3	7	3	11	11	15	150	145	85	67	110	56	177	60	116	81	50	71
Zirconium (Zr)	mg/kg	105.5	57	126	10.3	55	93.6	119.5	174	68.1	10.6	66.9	105.5	97.6	53.3	137	91.9	85	146	105.5
ABA Analysis																				
pH, paste	—	8.1	6.6	6.6	6.2	7	8.6	8.4	8.2	8.4	8.9	9.3	9.1	9.2	8.7	6.4	9	9.1	9.4	9.1
Acid Neutralizing	g CaCO3/kg	14	2	2	3	9	4	1	37	45	60	35	42	13	22	10	34	60	14	18
Acid Producing	g CaCO3/kg	0.9	0.3	<0.3	<0.3	<0.3	<0.3	<0.3	3.8	1.3	1.9	0.6	0.9	<0.3	3.1	2.8	2.8	<0.3	<0.3	0.6
Net Acid Generation	g CaCO3/kg	13	2	2	3	9	4	1	33	44	58	34	41	13	19	7	31	60	14	17
Ratio (NP:MPA)	—	14.93	6.4	12.8	19.2	57.6	25.6	6.4	9.87	36	32	56	44.8	83.2	7.04	3.56	12.09	384	89.6	28.8
Total S	%	0.03	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.12	0.04	0.06	0.02	0.03	<0.01	0.1	0.09	0.09	<0.01	<0.01	0.02
Sulphide S	%	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.11	0.02	0.05	0.02	0.02	<0.01	0.09	0.02	0.07	<0.01	<0.01	0.02
Sulphate S (Carb leach)	%	0.01	0.01	0.01	0.02	<0.01	<0.01	<0.01	0.01	0.02	0.01	<0.01	0.01	<0.01	0.01	0.07	0.02	0.01	<0.01	<0.01
Sulphate S (HCl leach)	%																			
Inorganic Carbon	%	0.14	<0.05	<0.05	<0.05	<0.05	0.06	<0.05	0.2	0.44	0.64	0.32	0.36	<0.05	0.12	<0.05	0.33	0.56	0.08	0.11
CO2	%	0.5	0.2	<0.2	<0.2	<0.2	0.2	<0.2	0.8	1.6	2.3	1.2	1.3	0.2	0.4	<0.2	1.2	2.1	0.3	0.4

		Aggregate Q17	Aggregate Q17A	Aggregate Q17B	Aggregate Q17C	Aggregate Q18	Aggregate Q19	Aggregate Q20	Aggregate Q21	Aggregate Q22	Aggregate Q23	Aggregate Q24	Aggregate Q25	Aggregate Q26A	Aggregate Q26B
Metals															
Aluminum (Al)	%	7.53	5.78	7.18	6.88	7.06	6.76	7.16	7.83	6.49	4.18	4.8	0.29	3.29	3.92
Antimony (Sb)	mg/kg	0.18	0.09	0.12	0.1	0.31	0.09	0.1	0.07	0.78	0.09	0.31	0.05	0.13	0.15
Arsenic (As)	mg/kg	0.2	0.3	0.3	0.3	0.4	0.6	0.8	0.3	3.3	2.3	5.1	0.4	1.6	1
Barium (Ba)	mg/kg	530	790	830	820	960	900	1120	500	1350	70	170	30	190	390
Beryllium (Be)	mg/kg	2.41	1.17	1.29	0.98	1.09	0.74	0.97	1.07	1.13	1.02	1.84	0.07	0.95	0.76
Bismuth (Bi)	mg/kg	0.32	0.1	0.05	0.1	0.12	0.13	0.07	0.06	0.04	0.14	0.27	0.02	0.05	0.07
Cadmium (Cd)	mg/kg	0.06	0.04	0.06	0.02	0.04	0.03	0.02	0.05	0.04	<0.02	0.02	<0.02	<0.02	0.02
Calcium (Ca)	%	2.64	1.3	1.75	0.82	1.77	1.52	1.11	3.11	0.51	0.02	0.05	0.01	0.13	0.8
Cerium (Ce)	mg/kg	54.2	46.8	58.3	22.4	84.5	67.4	58.2	55	107	35.3	36.5	6.69	13.85	19.75
Cesium (Cs)	mg/kg	8.33	0.43	0.65	0.59	0.62	2.22	1.42	1.36	2.12	0.91	2.05	0.12	1.17	1.48
Chromium (Cr)	mg/kg	31	36	18	6	7	23	29	14	18	26	26	15	39	26
Cobalt (Co)	mg/kg	12.6	7.7	8.2	2.5	5.5	10	8.7	22.9	2.2	1.5	3.1	0.3	6.6	4.8
Copper (Cu)	mg/kg	28.3	4.6	6.7	2.6	15.9	23.1	52.7	42.5	7.8	6.1	8.3	1.2	27.3	3.2
Gallium (Ga)	mg/kg	24.4	16.55	20.1	19.4	18.15	18	17.75	22.2	19.1	11.85	13.9	0.83	8.27	9.07
Germanium (Ge)	mg/kg	0.15	0.18	0.22	0.16	0.21	0.2	0.21	0.28	0.28	0.12	0.16	0.06	0.12	0.15
Hafnium (Hf)	mg/kg	2	1.9	2.9	2.2	3	3.2	2.7	2	5.4	1.9	2	0.7	3.7	3.2
Indium (In)	mg/kg	0.042	0.022	0.041	0.017	0.025	0.046	0.023	0.042	0.059	0.009	0.02	<0.005	0.015	0.015
Iron (Fe)	%	2.82	2.11	2.5	1.48	2.1	2.72	1.97	4.67	2.33	1.68	3.05	0.37	1.65	1.63
Lanthanum (La)	mg/kg	24.1	23.7	28.3	12.2	42	38	31.2	25.9	53.3	16	16.1	3.6	6.5	11.9
Lead (Pb)	mg/kg	16.7	10.5	12.5	8.6	7.2	18.5	30.4	9.8	15	3.8	22.6	1.7	6.2	10.2
Lithium (Li)	mg/kg	9.3	8.4	15.3	7.6	13.8	13.6	18.8	20.9	7.1	36.3	26.5	1.3	10.1	16.8
Magnesium (Mg)	%	1.31	0.77	0.73	0.29	0.58	0.87	0.75	1.46	0.18	0.06	0.08	0.01	0.41	0.45
Manganese (Mn)	mg/kg	598	307	477	260	357	392	304	735	226	39	77	36	199	239
Molybdenum (Mo)	mg/kg	0.38	0.27	0.31	0.13	0.9	0.16	0.18	0.2	0.26	0.29	0.89	0.16	0.16	0.2
Nickel (Ni)	mg/kg	19.2	20.2	13.5	2.2	5.8	17.1	14.7	20	1.9	4.4	5	1.2	12.1	3.6
Niobium (Nb)	mg/kg	12.5	3.7	7.9	5	6.9	3.2	4.5	5.3	7.4	3.1	4	0.3	2.3	3.3
Phosphorous (P)	mg/kg	900	570	860	330	690	440	580	1440	200	150	90	10	120	190
Potassium (K)	%	2.62	1.15	1.72	2.66	1.62	1.88	2.67	1.26	3.03	0.66	1.91	0.12	1.12	1.26
Rhenium (Re)	mg/kg	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Rubidium (Rb)	mg/kg	150	40.9	63.3	67.6	44.6	47	71	44.7	75.5	46.7	53.1	6.5	68.1	66.1
Scandium (Sc)	mg/kg	10.9	6.1	9.3	3.7	4.9	7.6	6.4	17.4	6.4	5	5.3	0.3	5.8	5.6
Selenium (Se)	mg/kg	1	1	2	1	2	2	2	2	2	2	2	1	1	1
Silver (Ag)	mg/kg	0.1	0.04	0.1	0.03	0.04	0.05	0.08	0.05	0.1	0.03	0.06	0.01	0.04	0.05
Sodium (Na)	%	3.67	3.13	2.98	2.92	3.16	2.57	2.92	3.16	2.88	0.01	0.03	0.01	0.24	1.1
Strontium (Sr)	mg/kg	901	528	526	301	540	444	464	652	161.5	155	56.2	5.6	81.7	169
Sulphur (S)	%	<0.01	<0.01	<0.01	<0.01	0.05	0.02	0.01	0.06	<0.01	<0.01	<0.01	<0.01	0.01	<0.01
Tantalum (Ta)	mg/kg	2.12	0.27	0.67	0.23	0.41	0.18	0.33	0.26	0.43	0.23	0.27	<0.05	0.19	0.29
Tellurium (Te)	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.1	<0.05	<0.05	<0.05
Thallium (Tl)	mg/kg	0.93	0.27	0.36	0.33	0.19	0.27	0.36	0.27	0.36	0.28	0.27	0.04	0.5	0.52
Thorium (Th)	mg/kg	6	7.1	10.4	5.3	7.6	17.9	11	1.6	8.5	5.3	8.6	1.3	4.9	7.7
Tin (Sn)	mg/kg	3.4	0.7	1.3	0.7	0.8	0.7	0.7	0.8	1	0.6	0.7	<0.2	0.6	0.6
Titanium (Ti)	%	0.242	0.188	0.252	0.14	0.217	0.195	0.183	0.42	0.142	0.14	0.167	0.009	0.139	0.116
Tungsten (W)	mg/kg	0.2	0.6	0.5	0.8	1.9	0.3	0.2	0.3	0.5	2.3	7.4	0.1	0.7	0.5
Uranium (U)	mg/kg	2.6	0.7	1.5	0.4	0.6	1	1.3	0.5	1.2	0.6	0.6	0.2	0.6	0.6
Vanadium (V)	mg/kg	76	46	46	19	40	53	42	118	16	12	26	2	50	31
Yttrium (Y)	mg/kg	12.8	6.2	11.4	6.6	9.6	7.2	9	15.5	17.3	1.5	3.5	1.1	7.1	6.7
Zinc (Zn)	mg/kg	56	41	59	33	27	45	37	71	49	4	7	<2	15	22
Zirconium (Zr)	mg/kg	43.5	76	91.7	70	107.5	103.5	85.9	83.5	195	59.4	60.4	24	130.5	99
ABA Analysis															
pH, paste	---	9.3	9.4	8.9	9	9.4	9.2	9.1	8.7	9.3	6.3	6.7	6.1	8.3	8.5
Acid Neutralizing	g CaCO3/kg	38	26	19	9	27	14	15	24	10	0	2	1	5	8
Acid Producing	g CaCO3/kg	0.3	<0.3	<0.3	<0.3	0.9	0.3	0.3	1.3	<0.3	0.3	<0.3	<0.3	0.3	<0.3
Net Acid Generation	g CaCO3/kg	38	26	19	9	26	14	15	23	10	0	2	1	5	8
Ratio (NP:MPA)	---	121.6	166.4	121.6	57.6	28.8	44.8	48	19.2	64	0	12.8	6.4	16	51.2
Total S	%	0.01	<0.01	<0.01	<0.01	0.03	0.01	0.01	0.04	<0.01	0.01	<0.01	<0.01	0.01	<0.01
Sulphide S	%	0.01	<0.01	<0.01	<0.01	0.03	<0.01	0.01	0.02	<0.01	0.01	<0.01	<0.01	0.01	<0.01
Sulphate S (Carb leach)	%	<0.01	<0.01	0.01	0.01	<0.01	0.01	<0.01	0.02	<0.01	<0.01	0.01	0.01	<0.01	<0.01
Sulphate S (HCl leach)	%														
Inorganic Carbon	%	0.33	0.2	0.12	<0.05	0.26	0.05	0.09	0.11	0.07	<0.05	<0.05	<0.05	<0.05	<0.05
CO2	%	1.2	0.8	0.5	0.2	1	0.2	0.4	0.4	0.3	<0.2	<0.2	<0.2	0.2	<0.2

Attachment C – SWEP Test Results

Sample ID	Units	Aggregate Q1A	Aggregate Q1B	Aggregate Q2	Aggregate Q3	Aggregate Q3A	Aggregate Q4	Aggregate Q5	Aggregate Q6	Aggregate Q7	Aggregate Q8	Aggregate Q9	Aggregate Q10	Aggregate Q11	Aggregate Q12
Sample Mass	g	134.30	132.16	134.91	134.44	133.30	132.53	129.86	131.39	132.57	131.65	132.44	132.98	134.80	133.45
Water Added Mass	g	401.03	400.60	400.86	400.01	400.96	401.17	401.46	401.31	402.99	401.31	401.17	400.98	401.46	401.70
pH	--	5.60	4.78	5.57	4.32	3.73	4.87	3.55	7.40	6.79	5.86	7.48	5.07	4.52	5.79
Specific Conductance	mS														
Acidity (as CaCO3)	mg/L	9.4	8.0	3.4	28.8	18.8	4.0	26.4	<2.0	<2.0	2.6	<2.0	13.2	13.0	3.8
Alkalinity, Total as CaCO3	mg/L														
Aluminum (Al)	mg/L	0.040	0.018	0.012	0.039	0.038	0.039	0.054	0.432	0.055	0.345	0.260	0.308	0.027	0.712
Antimony (Sb)	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Arsenic (As)	mg/L	0.0071	0.0073	0.0059	0.0053	0.0098	0.0055	0.0101	<0.0010	0.0481	0.0066	0.0012	0.0045	0.0052	0.0045
Barium (Ba)	mg/L	0.013	<0.010	<0.010	<0.010	<0.010	0.014	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Beryllium (Be)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Bismuth (Bi)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Boron (B)	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Cadmium (Cd)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Calcium (Ca)	mg/L	9.44	<0.50	<0.50	<0.50	<0.50	0.50	<0.50	5.94	6.23	7.40	4.31	3.78	<0.50	6.02
Chromium (Cr)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cobalt (Co)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00072	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Copper (Cu)	mg/L	0.0072	<0.0010	0.0089	0.0024	0.0017	0.0012	<0.0010	0.0047	0.0076	0.0128	0.0040	0.0049	<0.0010	0.0066
Iron (Fe)	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Lead (Pb)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium (Mg)	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.69	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Manganese (Mn)	mg/L	0.0587	<0.0010	<0.0010	0.0013	0.0053	0.0245	<0.0010	0.0036	0.0138	0.0035	0.0109	0.0111	0.0048	0.0071
Molybdenum (Mo)	mg/L	0.0025	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Nickel (Ni)	mg/L	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Phosphorus (P)	mg/L	<0.050	0.079	0.060	<0.050	0.102	<0.050	<0.050	<0.050	<0.050	<0.050	0.075	0.056	<0.050	0.169
Potassium (K)	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Selenium (Se)	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Silicon (Si)	mg/L	0.26	0.18	0.14	0.32	0.31	0.30	0.47	0.52	0.42	0.74	0.26	0.39	0.17	1.03
Silver (Ag)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Sodium (Na)	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.57
Strontium (Sr)	mg/L	0.0371	<0.0010	<0.0010	<0.0010	<0.0010	0.0021	<0.0010	0.0134	0.0084	0.0080	0.0187	0.0114	<0.0010	0.0123
Sulfur (S)	mg/L	<1.00	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.3	<1.0	<1.0	<1.0	<1.0	<1.0
Thallium (Tl)	mg/L	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
Tin (Sn)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Titanium (Ti)	mg/L	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0049
Tungsten (W)	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Vanadium (V)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0015	<0.0010	<0.0010	<0.0010	0.0017
Zinc (Zn)	mg/L	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Zirconium (Zr)	mg/L	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040
Sulphate	mg/L	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	3.9	<3.0	<3.0	<3.0	<3.0	<3.0

Sample ID	Units	Aggregate Q13	Aggregate Q14	Aggregate Q15	Aggregate Q16	Aggregate Q16A	Aggregate Q17	Aggregate Q17A	Aggregate Q17B	Aggregate Q17C	Aggregate Q18	Aggregate Q19	Aggregate Q20	Aggregate Q21	Aggregate Q22
Sample Mass	g	130.23	130.26	132.66	134.06	131.36	130.83	130.29	130.25	133.50	130.33	130.92	130.80	130.14	134.51
Water Added Mass	g	400.34	400.35	401.43	400.62	400.94	402.82	400.91	400.96	400.64	400.05	401.10	400.35	400.74	401.08
pH	--	3.42	5.13	5.21	5.30	4.91	4.70	7.39	4.42	3.60	5.79	4.98	7.72	4.66	3.73
Specific Conductance	mS														
Acidity (as CaCO3)	mg/L	19.8	3.0	9.6	6.4	5.6	7	7.4	5.2	18.0	24.0	5.0	3.8	14.2	14.8
Alkalinity, Total as CaCO3	mg/L														
Aluminum (Al)	mg/L	0.112	0.146	0.291	0.048	0.071	0.465	0.288	0.086	0.029	0.170	0.025	0.082	0.045	0.014
Antimony (Sb)	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Arsenic (As)	mg/L	0.0016	0.0035	0.0019	0.0086	0.0086	0.002	0.0029	0.0019	0.0063	<0.0010	0.0013	0.0077	0.0044	0.0171
Barium (Ba)	mg/L	<0.010	<0.010	0.015	0.028	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Beryllium (Be)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Bismuth (Bi)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Boron (B)	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Cadmium (Cd)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Calcium (Ca)	mg/L	<0.50	3.42	4.94	4.49	1.91	4.25	4.51	0.60	<0.50	4.17	0.60	2.73	1.52	<0.50
Chromium (Cr)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cobalt (Co)	mg/L	0.00124	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00056
Copper (Cu)	mg/L	0.0226	0.0022	0.0056	0.0045	0.0023	0.0072	0.0021	0.0013	<0.0010	0.0072	0.0015	0.0026	0.0023	<0.0010
Iron (Fe)	mg/L	0.105	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Lead (Pb)	mg/L	0.0012	<0.0010	<0.0010	<0.0010	0.0011	<0.0010	<0.0010	<0.0010	0.0013	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium (Mg)	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Manganese (Mn)	mg/L	0.0121	0.0160	0.0014	0.0126	0.0576	0.0026	0.0053	0.0111	0.0014	0.0043	0.0102	0.0216	0.0069	0.0058
Molybdenum (Mo)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Nickel (Ni)	mg/L	0.0039	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Phosphorus (P)	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.059	<0.050	<0.050	<0.050	0.055	0.054	<0.050	<0.050	<0.050
Potassium (K)	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Selenium (Se)	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Silicon (Si)	mg/L	0.88	0.21	0.46	0.17	0.34	0.38	0.33	0.31	0.19	0.21	0.11	0.28	0.26	<0.10
Silver (Ag)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Sodium (Na)	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Strontium (Sr)	mg/L	0.0015	0.0090	0.0182	0.0237	0.0086	0.0221	0.0253	0.0024	<0.0010	0.0094	0.0012	0.0056	0.0031	<0.0010
Sulfur (S)	mg/L	1.6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Thallium (Tl)	mg/L	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
Tin (Sn)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Titanium (Ti)	mg/L	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Tungsten (W)	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Vanadium (V)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)	mg/L	0.0048	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Zirconium (Zr)	mg/L	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040
Sulphate	mg/L	4.8	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0

Sample ID	Units	Aggregate Q23	Aggregate Q24	Aggregate Q25	Aggregate Q26A	Aggregate Q26B
Sample Mass	g	130.84	130.68	131.49	130.68	131.66
Water Added Mass	g	401.80	405.99	401.86	401.20	401.34
pH	--	5.83	3.75	4.63	4.28	4.17
Specific Conductance	mS					
Acidity (as CaCO3)	mg/L	6.4	35.8	3.0	16.0	15.2
Alkalinity, Total as CaCO3	mg/L					
Aluminum (Al)	mg/L	0.042	0.03	<0.010	0.067	0.017
Antimony (Sb)	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Arsenic (As)	mg/L	0.0074	0.0613	0.0073	0.0063	0.0215
Barium (Ba)	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010
Beryllium (Be)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Bismuth (Bi)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Boron (B)	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050
Cadmium (Cd)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Calcium (Ca)	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50
Chromium (Cr)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cobalt (Co)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Copper (Cu)	mg/L	<0.0010	0.0019	<0.0010	0.0032	<0.0010
Iron (Fe)	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050
Lead (Pb)	mg/L	<0.0010	<0.0010	0.0011	<0.0010	<0.0010
Magnesium (Mg)	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50
Manganese (Mn)	mg/L	0.0044	0.0031	0.0014	0.0173	<0.0010
Molybdenum (Mo)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Nickel (Ni)	mg/L	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Phosphorus (P)	mg/L	<0.050	<0.050	<0.050	0.052	0.159
Potassium (K)	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Selenium (Se)	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Silicon (Si)	mg/L	0.21	0.18	0.14	0.38	0.14
Silver (Ag)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Sodium (Na)	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50
Strontium (Sr)	mg/L	<0.0010	<0.0010	<0.0010	0.0027	<0.0010
Sulfur (S)	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Thallium (Tl)	mg/L	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
Tin (Sn)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Titanium (Ti)	mg/L	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Tungsten (W)	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Vanadium (V)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)	mg/L	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Zirconium (Zr)	mg/L	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040
Sulphate	mg/L	<3.0	<3.0	<3.0	<3.0	<3.0