



Renard Mine

Increase in Ore Extraction and Processing Rate

Our Ref.: 61470.051-100 (Version 0)

Application to Amend the Global CA (3214-14-041) —
Additional Document — Answers to MELCC's Questions
and Comments dated September 6, 2019

October 2019

Renard Mine

Increase in Ore Extraction and Processing Rate

Our Ref.: 61470.051-100 (Version 0)

Application to Amend the Global CA (3214-14-041) —
Additional Document — Answers to MELCC's Questions
and Comments dated September 6, 2019



Submitted to:

Provincial Administrator of the James Bay and Northern Quebec Agreement
Deputy Minister of the Environment and the Fight against Climate Change
Édifice Marie-Guyart, 30th Floor (Box 02)
675 René-Lévesque Boulevard East
Quebec City QC G1R 5V7

October 2019

PROJET TEAM

Stornoway Diamond Corporation

Martin Boucher

Vice-President, Environment, Health, Safety and Sustainable Development

Mélissa Karen Bruneau, MGP

Superintendent, Environment

Norda Stelo Inc.

Catherine Vallières, M.Sc., Biology

Project Manager
Water Quality Specialist

Vital Boulé, M.Sc. Biology

Technical Director, Environment

André Boilard, Eng., MBA

Air Quality Specialist

Karine Bureau, Geology

Mining Specialist
Environment Manager

Yves Racine

Cartographer, Data Base Technician

Mélissa Dubé, Administrative Assistant

Word Processing

Catherine Vallières

Catherine Vallières, M.Sc., Biology.
Project Manager

October 24, 2019

Date



Printed on recycled paper

TABLE OF CONTENTS

1	BACKGROUND.....	1
2	ANSWERS TO MELCC'S QUESTIONS AND COMMENTS	1

LIST OF TABLES

Table 1	Quantities extracted from open pits	7
---------	---	---

LIST OF MAPS

Map 1	General layout of the infrastructure, mining facilities and sensitive receptors	5
-------	---	---

1 BACKGROUND

This document contains the complementary information requested by the Ministry of Environment and the Fight against Climate Change (MELCC) in the questions and comments they addressed to Stornoway on September 6, 2019. The questions and comments are in regard to the Application to Amend the Renard Mine's Global Certificate of Authorization (CA) (ref. 3214-14-041), the purpose of which is to increase the ore extraction and processing rate at the mine.

2 ANSWERS TO MELCC'S QUESTIONS AND COMMENTS

QC-1. According to the information provided in section 3.3, the ore extraction rate from pit R65 will increase from 1,000 to 2,000 tonnes (or 2,500 tonnes) per day until 2024 so as to increase the ore processing rate to an average of from 7,000 to 8,000 tonnes (8,500 tonnes) per day.

As indicated in section 3.1 of the application to amend the certificate of authorization, new sectors could be developed (e.g., increasing the depth of ramps to the underground adits, building a second shaft, mining other known kimberlite sites such as R1, R7 and R10, as well as the Lynx and Hibou dykes, and undertaking exploration work in new sectors).

COMEX would like to remind the proponent that any activities to develop these sectors and related infrastructure that are not currently authorized would be subject to an amendment to the certificate of authorization.

[Answer to QC-1](#)

The objective of section 3.1 of the application to amend the certificate of authorization was to show that increasing the ore extraction and processing rate at the Renard mine would not reduce the projected operating life of the mine, which is 20 years. On the contrary, the life of the mine will be maintained and could even be extended since new sectors could be developed in future.

Stornoway takes due note of the MELCC's reminder, and the company is fully aware that any new operations and related infrastructure that are not currently authorized will be subject to an amendment to the certificate of authorization (ref. 3214-14-041). Stornoway will therefore at the appropriate time submit any required amendment applications for new mining operations to the authorities.

QC-2. To complete section 3.4 of the application to amend the certificate of authorization, please specify whether additional machinery will be needed to transport solid waste produced at the ore processing complex.

Answer to QC-2

As indicated in section 3.6.3 in the amendment application, the annual quantity of processed kimberlite to be managed will increase with the increase in the ore processing rate, by about 14% from a daily rate of 7,000 tonnes to 8,000 tonnes. Ore processing produces three types of waste. In accordance with recent monitoring results, the three types of waste are produced in the following average proportions:

- 10% waste rock produced by the sorting plant (20 to 230 mm);
- 55% coarse material (0.3 to 6 mm);
- 35% fine material in the form of pulp (< 0.3 mm).

Waste from the sorting plant and coarse material are transported by truck, whereas fine material is pumped in the form of pulp to the modified processed kimberlite containment (MPKC) facility.

Stornoway expects to be able to manage the increase in waste rock and coarse materials with its current fleet of two 75-tonne trucks. At a processing rate of 7,000 tonnes of ore per day, about 4,550 tonnes of waste rock from the sorting plant and coarse material are produced, which involves 61 truck trips. Increasing the ore processing rate by 1,000 tonnes per day will generate about 650 tonnes more waste rock from the sorting plant and coarse material, which would involve about nine truck trips. In short, a processing rate of 8,000 tonnes of ore per day would require 70 truck trips per day to transport 5,200 tonnes of waste rock from the sorting plant and coarse material to the MPKC facility. That would amount to 35 trips per truck for our fleet of two trucks, or about 1.5 trips per hour, or 41 minutes per trip per truck. This frequency of trips between the ore processing plant and the MPKC facility is totally achievable.

On the other hand, it is likely that larger capacity pumps will be required to transport the additional volume of fine material (pulp) to the MPKC facility, amounting to about an additional 350 tonnes per day.

QC-3. The projected average quantity of ore to be extracted from pit R65 varies in different sections of the application to amend the certificate of authorization. For example:

- **Section 4 states that “The plan is to extract 2,500 tonnes of ore per day from pit R65, or 1,500 tonnes more than initially anticipated.”**
- **Section 3.3 indicates that “the tonnage extracted from pit R65 will be increased to about 2,000 tonnes per day.”**

The proponent should explain this discrepancy, and indicate whether the average daily extraction rate it would like to have authorized is actually 8,000 tonnes per day (and not 8,500 tonnes per day).

Answer to QC-3

The tonnage figures in section 4 are incorrect. The text should read as follows: “The plan is to extract **2,000 tonnes** of ore from pit R65, or **1,000 tonnes** more than initially planned.” Stornoway confirms that the average daily ore extraction rate submitted for authorization is **8,000 tonnes per day** (bear in mind that that’s an annual daily average) or about 2,920,000 tonnes per year.

QC-4. Since the impact assessment was submitted, the procedure for assessing compliance with air quality standards and criteria has been reviewed for mining projects located on public lands. Compliance with standards and criteria is now verified at sensitive receptors, and the proponent is required to submit a map showing the location of sensitive receptors (e.g., permanent residences/camps, chalets, sites where traditional activities are carried out) in the modelling area, i.e., the roughly 10 km x 10 km area as defined in Appendix 2.2 of “Atmospheric Emissions Dispersion Modelling – Renard Diamond Mine Project – Ref. No.: 61470.012-200 – Final Version - December 2014” (hereinafter called the December 2014 dispersion study).

Answer to QC-4

The most recent air dispersion modelling guidelines for mining projects, “*Préparation et réalisation d'une modélisation de la dispersion des émissions atmosphériques - Projets miniers*,” issued in February 2017¹, indicated that: “(...) the proponent is required to demonstrate compliance with the standards and criteria at sensitive receptors located more than 300 m from the facilities using air dispersion modelling results, and is required to ensure all sensitive receptors have been considered.”

With regard to the Renard mine, the only sensitive receptors in the modelling zone are the workers accommodation complex and the Cree Cultural Center (Longhouse building) located within 300 m from the facilities. Within the 10 km by 10.5 km modelling area but more than 300 m from the facilities, no sensitive receptors were found. Map 1 indicates the location of these two receptors.

¹ Ministère du Développement durable, de l'Environnement et de la Lutte contre les changements climatiques. Préparation et réalisation d'une modélisation de la dispersion des émissions atmosphériques – Projets miniers. Guide d'instruction. Ministère du Développement durable, de l'Environnement et de la Lutte contre les changements climatiques. Février 2017. 94 pages.

QC-5. In section 4 of the application to amend the certificate of authorization, it is indicated that the amount of dust produced by surface operations will be less than the levels observed from 2015 to 2017. It is however essential to bear in mind that the increase involves operations at pit R65, whereas 2015 to 2017 operations primarily involved operations at pit R2/R3. Owing to the different spatial distribution of the sources, it is difficult to compare operations in the 2015-2017 period to planned operations. It would be more appropriate to use a scenario that involves operations at pit R65 for the comparison.

On the basis of the 2023 scenario in the December 2014 dispersion study, total particulate and PM_{2.5} concentrations correspond to 83 and 85% of their respective standards; however, when you compare what was modelled to what is planned, a number of particulate emission sources should increase significantly. The quantity of material extracted from pit R65, for example, increases from 1,055,845 tonnes/year to a maximum of 2,186,511 tonnes/year, or more than double what was initially planned. Transportation-related emissions are also likely to increase.

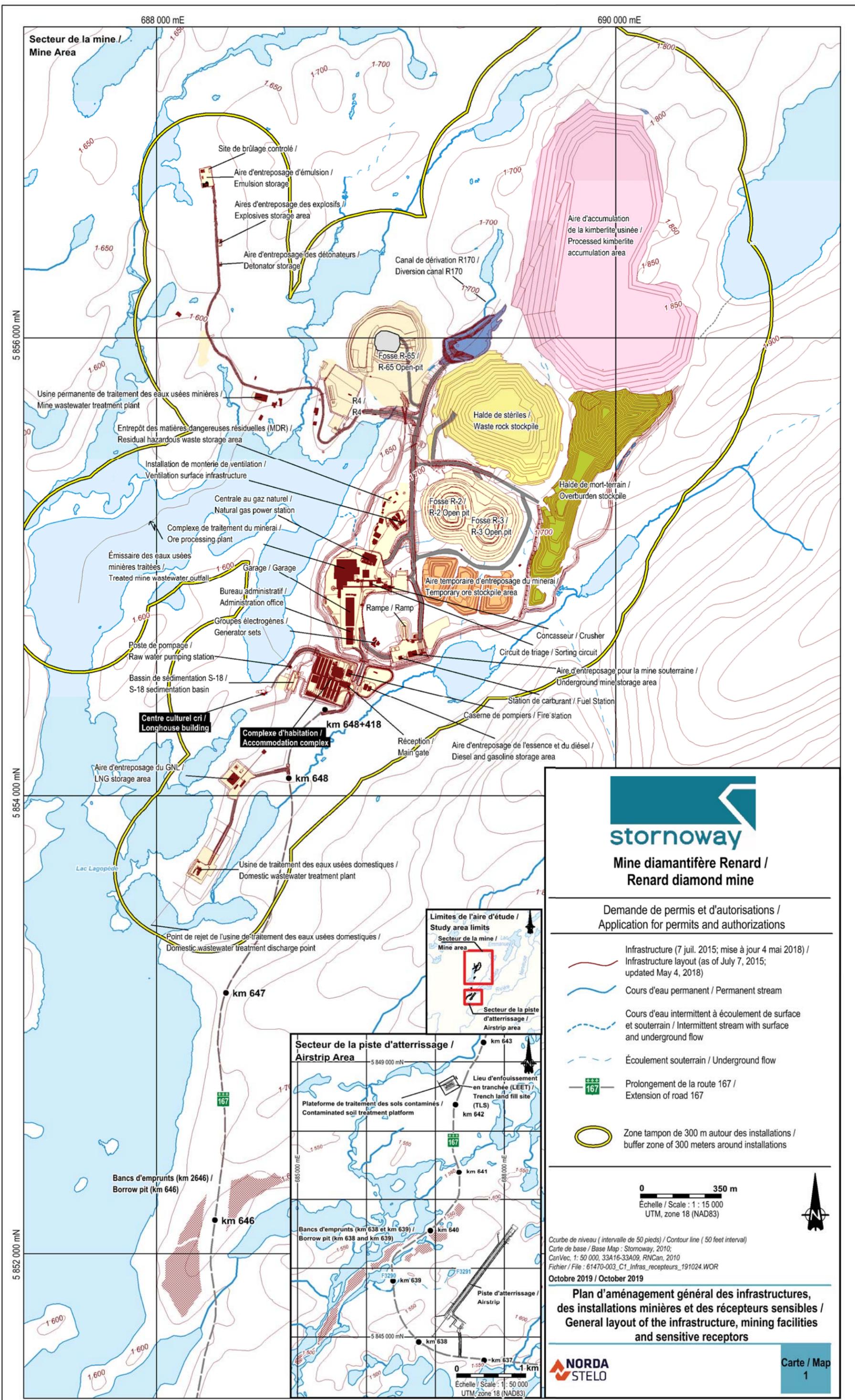
The proponent should clearly demonstrate that amendments to the project are not likely to significantly increase the concentration of airborne contaminants at the sensitive receptors. The proponent should compare the main contaminant emission sources specified in the December 2014 dispersion model with those anticipated following amendments to the project. If the proponent is not in a position to demonstrate this, it should submit an update to the air emissions dispersion model that accounts for project amendments.

Answer to QC-5

As indicated in the answer to question QC-4 above, there are no known receptors more than 300 m from the mining facilities. The only known sensitive receptors are located within the boundary of the mining facilities, i.e., the accommodation complex and the Cree Cultural Center (Longhouse building) (see Map 1).

Although the objective of the application is to increase the amount of ore extracted from pit R65, it should be noted that extraction operations were far greater in 2015, when operations were primarily focused on pit R2/R3. Table 1 specifies the quantities of waste rock, overburden and ore extracted from pits R2, R3 and R65 from 2015 to 2018, along with the quantities that are expected to be extracted from pit R65 from 2019 to 2024.

In 2015, the total quantities extracted from pits R2, R3 and R65 amounted to 5,169,535 tonnes, whereas the maximum quantities that will be extracted from pit R65 in a year will be about 2,343,376 tonnes in 2023, taking into consideration the increased extraction rate planned in this application to amend the CA. The quantities extracted from open pit mining in 2023 will represent 45.3% of that extracted in 2015.





**Mine diamantifère Renard /
Renard diamond mine**

Demande de permis et d'autorisations /
Application for permits and authorizations

<ul style="list-style-type: none"> Infrastructure (7 juil. 2015; mise à jour 4 mai 2018) / Infrastructure layout (as of July 7, 2015; updated May 4, 2018) Cours d'eau permanent / Permanent stream Cours d'eau intermittent à écoulement de surface et souterrain / Intermittent stream with surface and underground flow Écoulement souterrain / Underground flow Prolongement de la route 167 / Extension of road 167 Zone tampon de 300 m autour des installations / buffer zone of 300 meters around installations 	<p>0 350 m</p> <p>Echelle / Scale : 1 : 15 000 UTM, zone 18 (NAD83)</p> <p style="text-align: center;">  Nord N </p> <p><small> Courbe de niveau (intervalle de 50 pieds) / Contour line (50 feet interval) Carte de base / Base Map : Stornoway, 2010; CanVec, 1: 50 000, 33A16-33A09, RNCan, 2010 Fichier / File : 61470-003_C1_Infras_recepteurs_191024.WOR Octobre 2019 / October 2019 </small></p> <p style="text-align: center;">Plan d'aménagement général des infrastructures, des installations minières et des récepteurs sensibles / General layout of the infrastructure, mining facilities and sensitive receptors</p>
---	---



Carte / Map
1

Table 1 Quantities from surface extraction

Item		Total 2015-2024	Total 2015-2018	Total 2019-2024	Past Values				Future Values					
					2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Surface Extraction														
Pit R2/R3														
Total tonnage	(t)	12 370 143	12 370 143	0	4 104 225	4 076 930	3 571 474	617 514	0	0	0	0	0	0
Waste rock	(t)	7 841 040	7 841 040	0	1 854 503	3 400 590	2 390 834	195 113	0	0	0	0	0	0
Overburden	(t)	2 144 098	2 144 098	0	2 144 098	0	0	0	0	0	0	0	0	0
Ore from R2	(t)	1 659 620	1 659 620	0	27 124	449 956	840 708	341 831	0	0	0	0	0	0
Ore from R3	(t)	725 385	725 385	0	78 500	226 383	339 931	80 570	0	0	0	0	0	0
Pit R65														
Total tonnage	(t)	13 782 794	1 065 310	12 717 484	1 065 310	0	0	0	2 210 947	2 156 481	1 639 759	2 186 511	2 343 376	2 180 409
Waste rock	(t)	9 282 165	1 065 310	8 216 855	1 065 310	0	0	0	1 780 792	1 486 492	1 044 040	578 495	1 747 657	1 579 378
Overburden	(t)	724 182	0	724 182	0	0	0	0	0	172 010	0	552 171	0	0
Ore from R65	(t)	3 776 447	0	3 776 447	0	0	0	0	430 155	497 979	595 719	1 055 845	595 719	601 030
Total Surface Extraction														
Total tonnage	(t)	26 152 937	13 435 453	12 717 484	5 169 535	4 076 930	3 571 474	617 514	2 210 947	2 156 481	1 639 759	2 186 511	2 343 376	2 180 409
Waste rock	(t)	17 123 206	8 906 350	8 216 855	2 919 812	3 400 590	2 390 834	195 113	1 780 792	1 486 492	1 044 040	578 495	1 747 657	1 579 378
Overburden	(t)	2 868 280	2 144 098	724 182	2 144 098	0	0	0	0	172 010	0	552 171	0	0
Ore from pits	(t)	6 161 451	2 385 005	3 776 447	105 624	676 340	1 180 639	422 401	430 155	497 979	595 719	1 055 845	595 719	601 030
Percentage of year when extraction operations were at maximum levels	%				100.0%	78.9%	69.1%	11.9%	42.8%	41.7%	31.7%	42.3%	45.3%	42.2%

Atmospheric emissions are released by the following extraction-related sources:

- drilling and blasting of waste rock and ore;
- stripping of overburden;
- mine truck loading and unloading of materials (overburden, waste rock and ore);
- resuspension of dust on unpaved roads by trucks travelling to various destinations (overburden stockpile, waste rock pile, ore storage area, processing plant, MPKC facility);
- mobile equipment, which releases emissions.

Emissions from these sources are proportional to the quantity of material extracted. If the quantities extracted in 2023 are below that extracted in 2015, the quantities of contaminants released will also be reduced.

The modelling results moreover showed that maximum particulate concentrations occurred in the 2015 scenario and that these maximum concentrations were compliant with applicable standards for total particulates and fine particulates at the sensitive receptor sites identified within 300-m of the facilities.

Since the quantities extracted from pit R65 represent a maximum of 45.3% of the amount extracted in 2015, it is likely that total and fine particulate concentrations at the sensitive receptors were less than concentrations in 2015. And all the more so given that extraction activities in 2015 mainly involved pit R2/R3, which is closer to the accommodation complex and the Cree Cultural Center than pit R65, where all the extraction operations will take place between 2019 and 2024.

It should also be noted that the quantity of material transported by truck from the ore processing plant to the MPKC facility is lower than initially anticipated in the 2014 modelling. Changes made to the processing procedure since the model was prepared have meant that the finest processed kimberlite is now pumped to the MPKC facility through a pipeline, thereby reducing the number of truck trips required to transport waste, along with related emissions. As indicated in our answer to QC-2, 35% of the processed kimberlite is fine and is therefore pumped via pipeline. The amount transported by truck therefore represents only 1,898,000 tonnes (i.e., 65% of 2,920,000 tonnes) instead of the 2,555,000 tonnes predicted in the initial modelling.

Finally, environmental monitoring undertaken since 2015 has demonstrated that suspended particulate and fine particulate concentrations are still within applicable standards beyond the 300-m limit from the facilities, even in the years when surface extraction rates were clearly higher than future rates forecast for pit R65 as a result of the increase in extraction and processing rates covered by this application to amend the Global CA.



1 800 463-2839
info@norda.com
norda.com