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© COPH, Matawinie Mine Site

Report on mining exploration impacts on water by Nouveau Monde Graphite in Haute-Matawinie, Québec (Canada)

Analysis of a community environmental monitoring project of sediments in streams draining the Matawinie mine site

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EXECUTIVE SUMMARY

Nouveau Monde Graphite (NMG) is currently developing its "Matawinie project" to extract graphite in the municipality of Saint-Michel-des-Saints, located in the Canadian province of Quebec.

Exploration and development work on the site was carried out between 2013 and 2019. Aware of the lack of engagement by Quebec's Ministry of the Environment during this period and fearing that exploration activities had compromised the integrity of the environment surrounding the Matawinie site, residents of the region came together to conduct sediment sampling of the waterways bordering the mine site.

This grassroots environmental monitoring campaign took place in the fall of 2021 and had the following objectives:

- Determine to what extent, if any, Nouveau Monde Graphite's exploration work may have contributed to the deterioration of aquatic ecosystems bordering the site
- And to cross-check, in an analysis independent from the mining company, certain elements of the water body characterization studies that were commissioned by NMG as part of its own project impact study.

The sampling and analysis work that followed identified worrying amounts of metal concentrations in the sediments, raising fears of adverse biological effects on aquatic fauna in various locations bordering the Matawinie site.

© COPH, Mine water management pond at the Matawinie mine site

©COPH, Deforestation and development of the Matawinie mining site

1. INTRODUCTION

Following the announcement of the Matawinie project, a graphite mine proposed by the company Nouveau Monde Graphite (NMG) in the municipality of Saint-Michel-des-Saints, residents in the region came together to carry out tests to monitor potential adverse environmental effects of exploration. These residents are members or supporters of the Coalition of Opponents of the Mining Project in Haute-Matawinie (COPH in French).

The residents quickly noted the absence of the ministry responsible for the environment (referred to as the MELCC throughout the rest of the text for the Ministère de l'Environnement et de la Lutte contre les changements climatiques) at the Matawinie site during the exploration phase. This provoked early concerns about the potential impact of these activities on the territory adjacent to the urban perimeter of Saint-Michel-des-Saints. To respond to these concerns, the groups undertook an initial sampling and sediment analysis in the fall of 2021. The main goal was to determine whether the exploratory work prior to the construction and operation of the mine may have contributed to the deterioration of aquatic ecosystems and to what extent, if any. The secondary objective was to verify, through an analysis independent of the mining company, the results of the water body characterization studies commissioned by NMG as part of its environmental impact assessment.

The work required for this environmental monitoring was funded primarily through a grant from the Western Mining Action Network (WMAN). Contributions were also made by MiningWatch Canada, Nature Québec, the Coalition Québec meilleure mine, and the COPH. Ultimately, it was the Society Against Pollution (SVP) that organized the work, trained the residents, analyzed the data, and then made an initial presentation of the results at a WMAN conference held in Reno, Nevada in October 2022.

2. DESCRIPTION OF THE MINING PROJECT

Nouveau Monde Graphite Inc. (NMG) plans to mine a graphite deposit in Saint-Michel-des-Saints in the region of Lanaudière, in the province of Quebec, in Canada. The deposit is expected to produce 100,000 tonnes of graphite concentrate annually over a 26-year period. In the impact assessment documents, construction was planned to begin in February 2021 and operations were scheduled to begin in June 2023. It was envisaged that the post-restoration environmental monitoring planned by NMG would be undertaken for a minimum period of 10 years.

Prior to the construction phase, NMG operated a pilot plant which also entailed completing excavation work, as well as managing mine waste and wastewater, which we will detail below.

NMG has been carrying out construction work at the mine site since 2021, but full construction of the site has yet to be completed. According to the company's 2023 annual report, they have completed de-

Figure 1

Site of the future Matawinie mine during the construction phase (Open Forest, screenshot taken in August 2024)

forestation work, built an 8-kilometre access road, carried out activities excavating ditches and water catchment basins, and preparing areas for the accumulation of overburden.[1]

The planned infrastructure – once construction is complete – will include an open pit, a waste rock and tailings accumulation area, and an overburden accumulation area. Also planned are an ore concentration plant, a tailings desulphurization plant, a drainage water collection system, and a water treatment plant.[2]

2.1 Description of the exploration work

Exploration work for NMG's Matawinie project was mainly carried out between 2013 and 2019. In particular, 149 exploratory drillings were carried out between 2014 and 2019, totaling more than 26 linear kilometres (km) of drilled holes.[3] These drillings are primarily aimed at collecting rock cores – long cylinders of rock extracted from the Earth's crust, typically about 5 centimetres in diameter and ranging in length from ten- to a few hundred metres.

1 Nouveau Monde Graphite. (2024). Annual Report 2023, online.

2 Quebec Ministry of the Environment and the Fight Against Climate Change (MELCC). (November 17, 2020). Environmental analysis report for the Matawinie mining project on the territory of the municipality of Saint-Michel-des-Saints by Nouveau Monde Graphite Inc., Directorate of Environmental Assessment of Mining and Northern Projects and Strategic Environmental Assessment, p.2-7, online.

3 BBA. (July 6, 2022). NI 43-101 Technical Feasibility Study Report for The Matawinie Mine and the Bécancour Battery Material Plant Integrated Graphite Projects, prepared for: Nouveau Monde Graphite, section 1.4. Drilling, p.1-5, online.

Figure 2

Example of channeling work carried out by Nouveau Monde Graphite (image from NMG public reports)[6]

In addition to these drill holes, exploratory trenches were dug[4] and channeling[5] was carried out.

The analysis of the samples collected – i.e., drill core, channel samples, and trench samples – is essentially aimed at delineating the limits of the deposit and determining the approximate grades of mineable graphite for NMG.

2.2 Description of the pilot plant operations

In preparation for the commissioning of the site, NMG excavated a small-scale pit – small in comparison to the projected size of the future mine – in order to test certain techniques for processing its ore, tailings management, and mine water treatment.

The "pilot" ore processing plant, referred to as a "demonstration plant" by NMG, is located in the former Louisiana Pacific facility in Saint-Michel-des-Saints and has been operational since the fall of 2018. In conjunction with the commissioning of the demonstration plant, a pit from which the excavation of 40,000 tonnes of ore has been authorized, a water treatment plant, water management basins, and mine waste storage cells have been installed on the site of the future mine. These installations, dating from the period from 2018 to 2021, are shown in the screenshot in Figure 3.

All of this work has already had an impact on the environment, due to the mining waste and mining wastewater generated and discharged at the site. It is therefore possible that the detection of potential contaminants during sampling is due to these site development operations and the various experimental operations carried out which would be used on a larger scale during the actual operation of the site.

4 Trenches dug in the ground with a mechanical shovel.

5 Making saw cuts on the surface of the rock to extract samples, broken with a sledgehammer and a metal pick, to a depth of a few centimetres and a length of tens of metres.

6 Quebec Ministry of Energy and Natural Resources (MERN). GM 71032 – Preliminary economic assessment report for the Matawinie graphite project, documentation submitted to the ministry by Nouveau Monde Mining Enterprises Inc., dated August 5, 2016, p.83 PDF. Original title of the image: "Figure 9.4 – Part of Trench TO-15-TR-5, Looking to the SSE". Document retrieved from the Sigéom – Examine platform.

7 Government of Quebec. Open Forest, online. Image retrieved from: SVP, 2022, op. cit., Figure 3b, p.10. For a schematic and more detailed representation of the exploration work, see: Figure 2, p.9, of the same report.

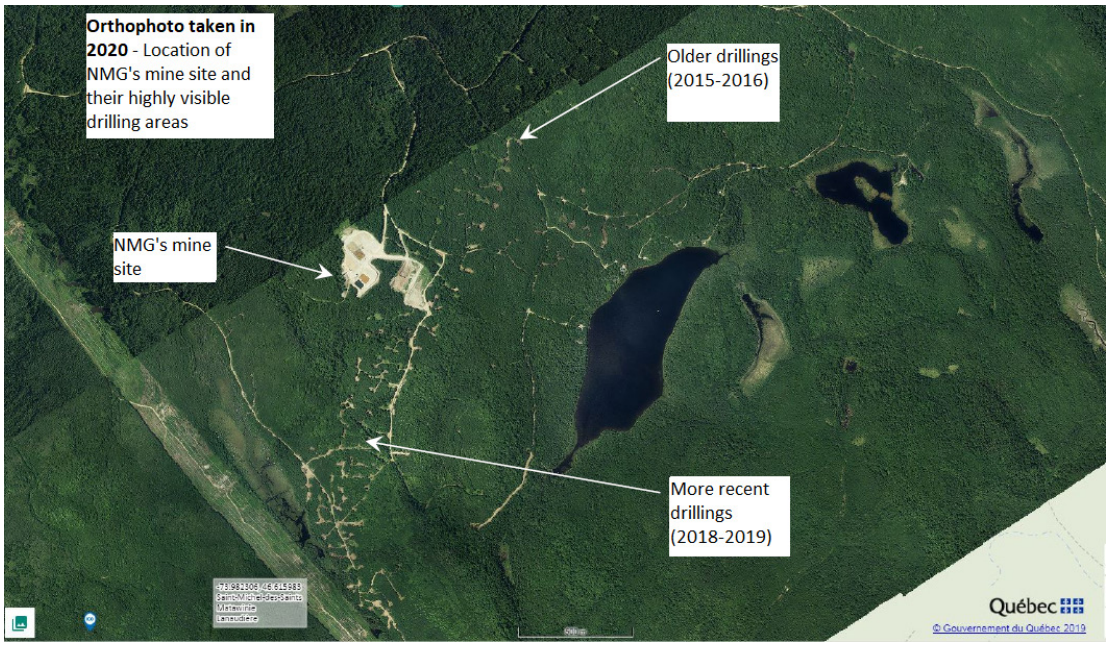


Figure 3

Orthophoto of the site of the future Matawinie mine in 2020 (Open Forest, 2022, from the SVP report)[7]

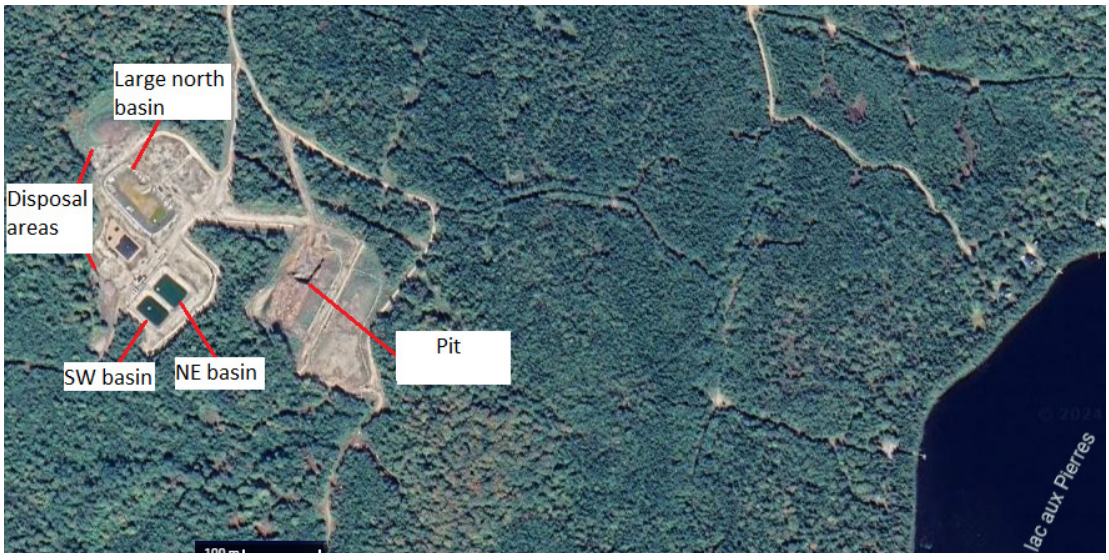


Figure 4

Site of the future Matawinie mine during the pre-construction test phase (Google Maps, 2018-2021)

2.3 Planned mining facilities

In 2019, NMG planned that after the initiation of the exploration phase, it would develop its site over an area of 2.9 km^2 with an estimated operating life of 26 years. This area will contain:

- The mining pit, with an estimated final length of 2.6 km and a width that should vary between 155 and 380 metres at the end of the operation, making it, at the time of writing, the largest open-pit graphite mine on the North American continent and one of the largest open-pits in the province;
- Waste rock and tailings accumulation areas and overburden (i.e., the bulk of "mine waste"), as well as ore accumulation areas;
- The industrial zone, which includes ore or tailings storage domes, the crusher, the ore processing plant, the desulphurization plant and the administrative offices;
- Facilities used for the management of water at the site, namely: drainage ditches, water collection or polishing ponds[8], the mine wastewater treatment plant, the final effluent and the domestic wastewater treatment plant;
- The garage and warehouse, as well as the area where hazardous products are stored and waste disposed of;
- The electricity distribution network and the electrical substation on site;
- The car park and guard house, as well as the access and service roads.[9]

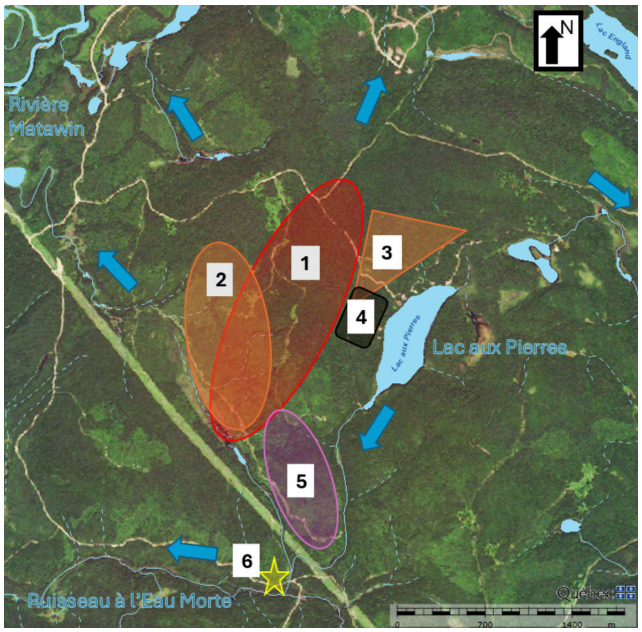


Figure 5

Simplified Hydrographic Network and Approximate Locations of Major Infrastructure Planned at the Mine Site (Legend: (1) Pit; (2) Waste rock and tailings accumulation areas; (3) Overburden accumulation area; (4) Industrial zone; (5) Water treatment plant and sedimentation ponds; (6) Final effluent). The blue arrows indicate the direction of flow of the rivers (adapted from the VGO map portal).[10]

8 Eau Secours (November 2023). Impacts of mining projects on water, Technical and legislative popularization guide to support community action, section 3.4.4 Water treatment, p.30.

9 MELCC, November 17, 2020, op. cit.

10 Government of Quebec. VGO, Map Portal, Interactive Map, online. It should be noted here that at least eight rivers flowing under zones (1) to (4) shown on this image are not represented on the government website. This image also does not show the layout of the wetlands at the site of the mine. For more details on these additional elements, see: MELCC, Environmental Assessment Registry (EAR). (December 2019). PR6 Environmental Impact Statement Summary, Matawinie Mine Project, SNC-Lavalin for Nouveau Monde Graphite. Map 12, p.78, online.

As the development of any mine site is often subject to modifications and expansions once the project has begun, it is possible that this information and the map below, showing the layout of the site, will be subject to changes in later phases of development. From experience, it is conceivable that the dimensions of the mining pit will be revised upwards during operation, to name but one possible change.

To briefly summarize, the main activities carried out on this site will include, on the one hand, the blasting and excavation of the pit, allowing the gradual removal of waste rock and overburden as well as the extraction of ore. In addition, plans indicate that the mined ore will be processed on site in order to transport the graphite concentrate off-site. The storage of waste rock, overburden, and tailings produced by ore processing is also planned. Finally, NMG aims to draw fresh water using an artesian well to supply its processes, as well as to manage its contaminated water using the various water collection or polishing basins and the water treatment plant (WTP).

The previous map shows how the majority of the water treatment facilities will be located southwest of the site: runoff from the site, wastewater from ore processing, as well as dewatering water from the pit[11] will be directed to this area where the wastewater treatment will take place. Once the water has been treated and deemed to comply with the current legislation, it will essentially be discharged into the environment at the point of the final effluent, indicated by a star on the map, and located in the Eau Morte stream.[12]

2.4 Environmental Impact Assessment of the Project

NMG's mining project has or will have significant impacts on water through its consumption of fresh water, its discharge of industrial wastewater, and the destruction or major disturbance of aquatic environments to build mining facilities. The impact of this is felt both in terms of the alteration of the quality of the water that is consumed by all living beings, and in terms of significant changes in water flows, volumes, and levels on which multiple aquatic species (fauna and flora) depend for their survival. Impacts on groundwater or surface water can also affect the socio-economic activities of surrounding communities.

According to the MELCC's report, the main issue in protecting water quality is the management of mine tailings that have an acidogenic potential (acidic pH) and the leaching of certain metals.[13]

NMG's mining project has been subject to an environmental impact assessment and review under Quebec's Environment Quality Act (EQA). The Bureau d'audiences publiques en environnement (BAPE) held public consultations from January 27 to May 26, 2020. The government decree [14] regarding the issuance of an authorization to NMG for its mining project on the territo-

11 "Water from dewatering" refers to the water that is pumped out of the excavation pit to keep it dry and to allow mining operations to continue.
12 For a more detailed description of the mining and water treatment activities on the site, see: MELCC, November 17, 2020, op. cit., p.7-18; or, dealing with more general issues: Eau Secours, November 2023, op. cit., p.7-31.
13 MELCC, November 17, 2020, op. cit., Contents.
14 Government of Quebec. (February 10, 2021). Decree 47-2021, January 20, 2021, Québec Official Gazette, 153rd year, No. 6.

ry of the municipality of Saint-Michel-des-Saints, under the EQA, was published on January 20, 2021.

The project has not undergone a federal impact assessment however, as graphite mines are not subject to the Impact Assessment Act (IAA). The federal Metal and Diamond Mining Effluent Regulations (MDMER) are also not applicable for the same reason: graphite is not a metal.

Similarly, exploration work (drilling, channeling, trenching) does not have to undergo an environmental assessment, as the magnitude of the impacts anticipated during this phase is considered "low" under the EQA. However, the impact of this work is not negligible and can affect the integrity of aquatic ecosystems.[15]

Indeed, exploration drilling and grooving cut and grind the drilled rock, generating splinters and dust that mix with the water that operators use to facilitate the cutting work of drills and saws. This mixture of water and residue is transformed into sludge loaded with contaminants present in the rock (heavy metals, sulphides, etc.). If not properly managed, this sludge can flow into the aquatic environments bordering the work and contaminate them.[16] The water sampling work undertaken for this report was aimed specifically at documenting the incidence and potential impact of such sludge flows.

© COPH, Mine water management pond at the Matawinie mine site

15 Eau Secours, november 2023, *op. cit.*, p.15.
16 For more details on the potential impacts of mineral exploration activities on water: idem.

3. COMMUNITY MONITORING PROJECT

The community monitoring project of NMG's explored and "upgraded" site consisted of collecting sediment samples from the watercourses bordering the site. Once collected, the element content[17] of these samples was analyzed in the laboratory. These results were then compared to control values (samples collected in an undisturbed environment) to see if the initial state of the environment had been altered by NMG's exploration activities.

This project consisted of four main stages. First, the SVP ensured a project plan was drawn up and that the local residents were trained. This training was held on October 24, 2021, on the banks of the Matawin River in Saint-Michel-des-Saints. These trained individuals then proceeded to collect sediment samples from the streams bordering NMG's exploration site. Sampling was conducted in the fall of 2021. These samples were then analyzed by Bureau Veritas, an accredited laboratory. Finally, SVP and Eau Secours, supported by the QMM coalition and MiningWatch Canada, proceeded with the analysis of the data obtained.

3.1 Objectives

The objectives of the community monitoring work and the analysis carried out in this report are, on the one hand, to assess whether or not the mineral exploration work - and the mud and contaminated water that this work generates - has actually affected the integrity of the water environments bordering the site. On the other hand, this project aims to verify whether the activities related to the operations of the ore refining pilot plant (excavation, discharge of treated water, etc.) have caused the deterioration or contamination of these same watercourses.

These analyses will also be relevant in the potential longer-term environmental monitoring of the site's operational activities. Indeed, subsequent analyses, produced within such a community monitoring framework independent of the mining company, can be compared to the results obtained in 2021 to assess the evolution of mineral concentrations in the aquatic environment surrounding the site. The 2021 data would then constitute reference values.

In addition, the publication of the results obtained as part of a sampling project such as this one is a rare opportunity to raise awareness within the community of the potential impacts associated with the implementation of an industrial project. The same applies to the sampling activities themselves, as well as to the training of community members prior to these activities.

3.2 Training of Community Members

As mentioned above, the training of local residents was carried out by the SVP, in collaboration with the COPH. This training focused on sampling techniques for surface sediments and surface waters of streams. Ultimately, trained community members

17 "Elements" here refers to the chemical elements of the periodic table found in the rock explored or extracted and which may possibly contaminate or alter the quality of an ecosystem, e. g. aluminum, arsenic, iron, cadmium, lead, sulphur, etc.

© COPH, Watercourse bordering the Matawinie mine site; QMM, Protest against the Matawinie mining project in Saint-Michel-des-Saints on December 8, 2018; COPH, Casing for an exploration hole drilled by Nouveau Monde Graphite

can collect these samples on their own and in line with the requirements of sampling standards for environmental analysis purposes. Equipping the residents of Saint-Michel-des-Saints in this way increases the chances of sustaining community monitoring of extraction activities, which could continue until the closure phase of the NMG mine site. Long-term independent environmental monitoring by the community is a strong incentive for the company to apply best practices to its operations, in order to limit its impact on the environment.

Although these activities require some form of financial support, particularly to pay for accredited laboratories to analyze samples, low cost sample collection itself can be carried out with reliable, but relatively unsophisticated equipment. With a view to increasing public participation, the training is designed in such a way that it could be delivered by anyone who has attended it and is familiar with its content. This allows the project to become more accessible to the general public.

3.3 Methodology

Only sediments from watercourses were sampled as part of community environmental monitoring. This was due to a lack of sufficient funds to sample surface water too. However, watercourses are an excellent indicator of the evolution of the contamination of river networks over time.[18] Indeed, sediments can, in certain circumstances that we have detailed in section 2.4 of this report, accumulate substances released from the bedrock through human activities such as mineral exploration. If contaminants are present among these, they can accumulate in the sediments. Community monitoring therefore aims to document this accumulation of substances in the sediments that have the potential to affect the quality of the aquatic ecosystems bordering the mining site.

The sampling campaign was planned and executed in accordance with the federal and provincial governments' *Guide for the Physico-Chemical and Toxicological Characterization of Sediments*, including the location of the samples, their number, the equipment necessary for their collection, and the method of preserving and trans-

18 A river system is a collection of permanent or temporary rivers, streams, and other watercourses, as well as lakes and reservoirs, in a given region.

porting them to the laboratory for analysis.[19]

The equipment needed to collect sediment samples include:

- A glass jar with a screw cap;
- A clamping collar;
- A sampling pole;
- A screwdriver (to tighten or loosen the clamp around the jar);
- Paper towels;
- A black marker;
- A cooler and the materials needed to take notes (paper, pencil, GPS, thermometer and/or cell phone).

As is usually the case in this type of community initiative, the cooler and the sampling jars were provided by the laboratory chosen to analyze the samples. The jars are labelled by the laboratory and are then identified by the individuals carrying out the sampling.

The sampling begins with the preparation of the pole, by attaching the clamping collar to its end. The open jar is then attached to the pole using the collar that is tightened at its base, to avoid breaking the jar. In order to avoid any contamination of the sample, the jar is then rinsed three times downstream of the sampling area: this is done by collecting sediment samples using the jar attached to the end of the pole. These rinsing samples are then poured back into the watercourse, always downstream of the area to be sampled.

Once the jar has been rinsed, the sediment sample can be collected in the designated area to be sampled. The jar will then be shaken slightly, making gentle back and forth movements with the pole in order to bring the water to the surface of the sample. This water must then be poured back into the watercourse. Once the supernatant water has been removed, the jar can be closed using the lid and cleaned with a paper towel. The sample should then be identified by labelling the jar with the marker, and the sampling sheet must be filled out, recording as much relevant information as possible to identify the site (e.g., "watercourse CE-2[20]"), such as the GPS coordinates of the collection site, the weather, the temperature, the date and time of sample collection, the name and contact information of the person who conducted the sampling, as well as the references of the photos of the site, if applicable. Any other relevant information can be added to the sheet. Finally, the clamp is unscrewed and the jar is placed in the cooler, then in a freezer to keep it cool until it is sent to the laboratory for analysis.

It should be noted that this methodology is an adaptation of the sampling techniques of the government ministries mentioned above. The main goal of this adaptation is to make sampling accessible to communi-

19 Ministry of Sustainable Development, Environment, and the Fight Against Climate Change (MDDELCC) & Environment and Climate Change Canada (ECCC). (December 2016). Guide to the Physico-chemical and Toxicological Characterization of Sediments.

20 The term "CE" is commonly used to identify a "watercourse" in a synthetic way. The watercourses sampled by the mining company, and then by the community members, will be referred to by this name from now on in the report.

ty members while preserving the validity of the samples and the scientific rigor of the protocol.

3.3.1 Location of the sampling sites

During the 2021 project, sediment sampling sites were selected based on the likelihood of the presence of potential contamination there due to exploration work. The location of these sites and the direction of flow of the streams is shown in Figure 5, presented below in the Results section. A reference site, located outside the zone of influence of contaminant releases, was also chosen to provide an idea of the ambient content of chemical elements in the sediments of the region.

The sampling sites are spread over three areas of the river network identified as SD-1, SD-2, and SD-4.

Zone SD-1 is located west of the exploratory work area and has only one sampling site in the CE25 watercourse:SD-1-1.

The SD-2 zone is the largest and includes the six (6) sampling sites identified from SD-2-3 to SD-2-8 that are located in the CE36 watercourse, south of the exploration work.

The SD-4 zone has only two sampling sites to the northwest: SD4-10, located in the CE22 watercourse, and SD4-12, located in the CE23 watercourse. It should be noted that SD4-12 is upstream of SD4-10 and is not located in the same stream branch.

The reference site, or control station, is located in the Eau Morte stream, south of the SD-2 zone and just before the confluence of the stream with the CE36 watercourse. It is identified as SD2-9, or SD-9. The location of this site was chosen so that it would be situated upstream of the final effluent discharge point for all the mine water of the future mining site.[21] It is therefore considered a "preserved" site from NMG's exploration activities.

3.3.2 Parameters used for measuring the sediments

Based on the type of mining activities planned, as well as the recommendations of the *Sampling Guide for Environmental Analysis*[22] and the Directive 019 on the Mining Industry of the MELCC,[23] and considering the available budget, the following parameters were chosen to detect potential contamination in sediments: metals and metalloids, total sulphur, total phosphorus, and selenium.

21 MELCC, December 2019, op. cit., map 12, p.78.
22 Ministry of the Environment, the Fight Against Climate Change in Wildlife and Parks (MELCCFP). (2023). Sampling Guide for Environmental Testing, Book 1 – General.
23 MELCCFP. (March 2012). Directive 019 on the Mining Industry.

4. RESULTS

4.1 Criteria for Evaluating Results

The values of various measured parameters (i.e., concentrations of the elements analyzed) must be compared to criteria to determine the presence or absence of contamination. In Quebec, the criteria generally used for sediments come from the guide produced jointly by the federal and provincial governments (the "Guide" in the rest of the text).[24]

According to this Guide, rare effect concentrations (RECs) and threshold effect concentrations (TECs) are the two benchmarks to be used when one wants to prevent contamination-related problems. The REC corresponds to the concentration below which no effects on aquatic fauna are anticipated. When the concentration exceeds the REC but is less than or equal to the TEC, the likelihood of the sediments impacting the environment is considered to be low. When the concentration exceeds the TEC, adverse effects on the aquatic environment will occasionally or likely be observed, depending on the extent to which this criterion is exceeded.

According to the authors of this Guide, these quality criteria were established based on data from multiple sources and can be used to assess the quality of sediments in water bodies and watercourses throughout Quebec jointly with the natural regional or ambient sediment concentrations.[25]

© COPH, Waterway bordering the Matawinie mine site

4.2 Sediment Data Collected by Nouveau Monde Graphite

As part of its impact assessment, NMG conducted a sampling campaign to establish the baseline state of the natural environment[26] before the project was implemented, for the purposes of its own environmental monitoring. With respect to sediments, the NMG campaigns took place during the summers of 2016 and 2018: an initial campaign conducted in the summer of 2016 in the lakes located in and around the restricted study area of future mining facilities, and a complementary campaign conducted in the summer of 2018 in the Eau Morte stream.

During our analysis of the results in section 4.3, we will use the data collected by NMG in the Eau Morte stream since they are located downstream of the runoff from the mine site as well as the drilling and trenching areas. This data can therefore be com-

24 Environment Canada (EC) & Ministry of Sustainable Development, Environment, and Parks of Quebec (MDDEP). (2007). Criteria for the assessment of sediment quality in Quebec and framework application: prevention, dredging and restoration. 39 pages.
25 Ibid., section 3.2, p.12.
26 MELCC, REE. (April 2019a). PR3.1 Impact Study - Volume 1, Matawinie Mining Project, SNC-Lavalin for Nouveau Monde Graphite. Chapter 5 - Description of the environment.

pared to community sampling data from areas that are also located downstream of the mining operations.

Data on the sediments collected in the Eau Morte stream by NMG are presented in Appendix 1 of this report. They include three sampling stations (Sed-Exp1, Sed-Exp2, Sed-Exp3) and the control station (Sed-Control). All of the data used to create the data table in Appendix 1 is available in the impact assessment completed by NMG[27].

Figure 6 below shows the NMG sediment sampling stations in the Eau Morte stream as well as the stations from the community sampling campaign.[28]

In its analysis of the results of the Eau Morte stream, NMG states the following:

> The results of the 2018 characterization of the Eau Morte stream indicate that the sediments of the Eau Morte stream are of good quality. The pH is slightly acidic, with averages varying between 6.23 and 6.55. Petroleum hydrocarbons are not detectable, with the exception of a sample at the control station. Metal analyses reveal only one exceedance of the REC for chromium. Most of the other parameters show results below the detection limits.[29]

Our reading of the NMG[30] data paints a completely different picture of the metals detected. In fact, results below the detection limits were obtained only for 10 metals out of a total of 20, for all stations, and for

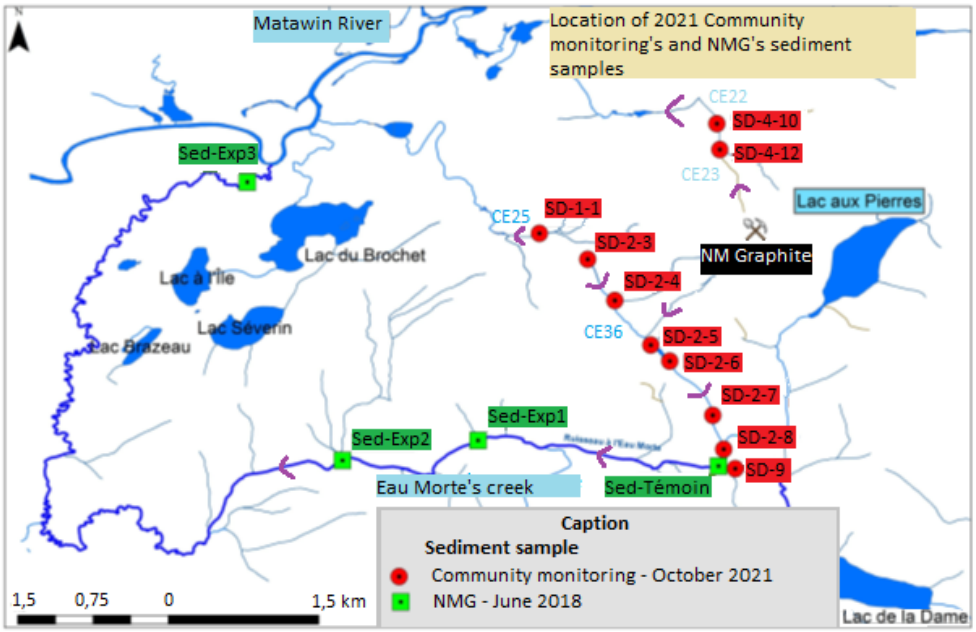


Figure 6

Map showing sediment sampling locations for Citizen Sampling (2021) and NMG (2018) (adapted from a map produced by SVP) Purple arrows indicate the direction of stream flow.

27 *Ibid.,* Table 5-23, p.349 PDF.

28 Original map created by the Society Against Pollution and adapted by Eau Secours. The adaptation of the original map includes: the identification of the features mapped (sampling points, legend, scale, title), the identification of watercourses, and the addition of arrows indicating the direction of flow of these watercourses.

29 MELCC, REE, April 2019a, op. cit., Section 5.3.10 Sediment Quality, p.347 PDF.

30 *Idem, see in particular Table 5-23 of the Impact Study – Volume 1.*

four metals for a few stations. In addition, we note exceedances of the values from the Sed-Témoin station at the Sed-Exp2 and Sed-Exp3 stations of the Eau Morte stream for the following 12 metals: aluminum, barium, chromium, cobalt, copper, iron, lithium, manganese, nickel, strontium, vanadium, and zinc. Some of these exceedances are also one to a few dozen times higher than the values of the Sed-Témoin station.[31] The Sed-Exp2 station has the highest exceedances. With the exception of the control station and the Sed-Exp1 station, the Eau Morte stream does not appear to be an environment free from the effects of anthropogenic activities.

Our in-depth analysis of the data emphasizes the importance of the government and NMG cross-checking the NMG reference values for environmental monitoring to ensure their accuracy and relevance. We recommend, at a minimum, excluding the Sed-Exp2 and Sed-Exp3 stations from the so-called "control" stations, as they visibly reflect a reference state already impacted by anthropogenic activity, and most likely by the mining exploration activities carried out on this site. Indeed, the elements for which exceedances are observed at these stations are metals and elements naturally present in the rock crushed, excavated, or displaced by mining operations. Their relatively high concentration in the samples therefore leads to the hypothesis that exploration activities have previously affected what NMG considers to be a "reference state". Comparing monitoring data at these two stations would therefore likely result in an underestimation of the impact attributable to industrial activities in future monitoring.

It should be noted that in 2021, the location chosen for the community monitoring campaign control station (SD-9) was only a few metres from NMG's Sed-Witness station in order to compare the data from these two control stations during the analysis of the results - which is done in Section 4.3 below.

© COPH, Waterway bordering the Matawinie site

31 See, in particular, the results for aluminum, barium, iron, manganese, and zinc presented in Appendix 1 of this report.

4.3 Results obtained during the community monitoring project

The sediment samples collected during the community sampling campaign were analyzed by the Bureau Veritas laboratory in December 2021. The values obtained can be found in Table 1 below:

First of all, it can be observed that no value could be detected for many elements. The elements for which little or no data has been obtained are: silver, arsenic, beryllium, tin, lithium, molybdenum, mercury, selenium, and thorium. The results of the analysis of these elements will therefore not be graphically represented in this section of the report.[32]

In addition, for the purposes of streamlining the analysis, certain elements such as sodium and potassium will not be discussed as to our knowledge, they generally pose less risk to the natural aquatic environment among the elements in this series of results.

Total extractable elements (mg/kg)								**Control station**		
	SD-1	**SD2-3**	**SD2-4**	**SD2-5**	**SD2-6**	**SD2-7**	**SD2-8**	**SD-9**	**SD4-10**	**SD4-12**
Aluminum	**4400**	**870**	**2000**	**4100**	**1500**	**3200**	**2300**	**2700**	**8200**	**2900**
Silver	*nd	*nd*	*nd*	*nd*	*nd*	*nd*	*nd*	*nd*	*nd*	*nd*
Arsenic	*nd*	*nd*	*nd*	*nd*	*nd*	*nd*	*nd*	*nd*	*nd*	*nd*
Barium	**59**	**89**	**27**	**67**	**18**	**28**	**17**	**26**	**62**	**28**
Beryllium	*nd*	*nd*	*nd*	*nd*	*nd*	*nd*	*nd*	*nd*	*nd*	*nd*
Cadmium	**0,31**	**0,39**	**0,10**	**0,69**	**0,17**	*nd*	*nd*	*nd*	**0,49**	nd
Chromium	**12**	*nd*	**2,2**	**4,3**	*nd*	**5,5**	**3,5**	**3,4**	**12**	**7,4**
Copper	**4,1**	**5,7**	**1,9**	**8,4**	**1,5**	**3,0**	**1,3**	**1,8**	**5,3**	**2,6**
Cobalt	**6,2**	*nd*	*nd*	*nd*	*nd*	**3,8**	**3,5**	*nd*	**11**	**2,3**
Tin	*nd*	*nd*	*nd*	*nd*	*nd*	*nd*	*nd*	*nd*	*nd*	*nd*
Iron	**12000**	**1800**	**920**	**3800**	**1600**	**12000**	**9900**	**5100**	**24000**	**7000**
Lithium	*nd*	*nd*	*nd*	*nd*	**50**	*nd*	*nd*	*nd*	**12**	*nd*
Manganese	**250**	**55**	**19**	**110**	**26**	**190**	**160**	**43**	**470**	**79**
Molybdenum	*nd*	*nd*	*nd*	*nd*	*nd*	*nd*	*nd*	*nd*	**2,7**	*nd*
Nickel	**11**	**2,7**	**1,4**	**7,3**	**1,9**	**4,4**	**2,8**	**3,3**	**9,1**	**5,7**
Mercury	*nd*	*nd*	*nd*	**0,16**	*nd*	*nd*	*nd*	*nd*	*nd*	*nd*
Lead	*nd*	**22**	*nd*	**13**	*nd*	*nd*	*nd*	*nd*	**6,4**	*nd*
Selenium	*nd*	*nd*	*nd*	*nd*	*nd*	*nd*	*nd*	*nd*	*nd*	*nd*
Sulphur (% g/g)	**0,015**	**0,71**	**0,042**	**0,59**	**0,067**	**0,013**	**0,015**	**0,037**	**0,055**	**0,014**
Strontium	**15**	**81**	**11**	**51**	*nd*	*nd*	*nd*	*nd*	**15**	*nd*
Thorium	**6,0**	*nd*	*nd*	*nd*	*nd*	*nd*	*nd*	*nd*	*nd*	*nd*
Vanadium	**24**	*nd*	*nd*	*nd*	*nd*	**22**	**12**	**8,3**	**38**	**8,8**
Zinc	**34**	**18**	**5,2**	**40**	**14**	**21**	**17**	**16**	**81**	**16**

**nd = not detected (value below the detection limit)*

Table 1

Total extractable element concentrations (mg/kg) in sediment samples collected at community sampling stations

32 Data on items that we chose not to discuss can be found in Appendix 5 of this report.

Finally, as briefly mentioned above, the elements selected and analyzed are those naturally present in rock, and thus they serve as positive indicators of the impact on water quality caused by mining activities.

4.3.1 Data Charts

Graphs have been produced for parameters with data above the detection limit at most stations, and are available in Appendix 2 of this report. These represent the following ten (10) elements, nine metals and sulphur: aluminum, barium, cadmium, chromium, copper, iron, manganese, nickel, sulphur and zinc. As an example, here is the zinc graph, showing the concentrations analyzed at the 10 community sampling stations, including the control station (SD-9) represented by a light green band on the graphs:

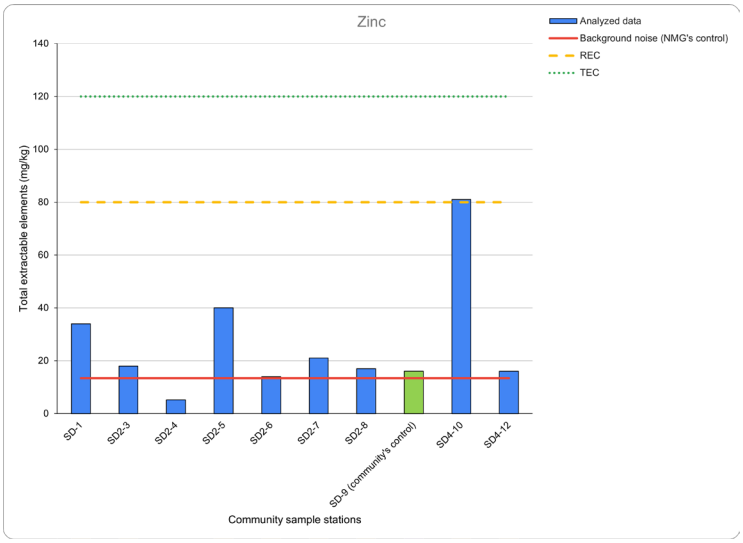


Chart 1

Zinc Concentrations Measured at community Sampling Stations (copy of Chart 2-10 in Appendix 2)

For comparison to ambient site values and some target values available in government literature, we added the NMG control station values, as well as the TEC and REC values where available (they were not established for all metals). Indeed, according to the government's guide to criteria for assessing sediment quality, the TEC and the REC can be used jointly with ambient concentrations to assess sediment quality (see section 4.1 above).

4.3.2 Ambient Levels - NMG Monitoring Station

In the case of the NMG control station values, these are averages from five (5) samples. Therefore, the data from the "Sed-Témoin" station seem to provide a reliable estimate of the local ambient content of the sediments (also called "background noise") of the elements analyzed.

In Graphs 2-1 to 2-10, presented in Appendix 2, we observe that the NMG control station provides values that are in the same order of magnitude as those measured at the SD-9 station of the community monitoring initiative. The fact that the values of the two stations that are located in the same place, within a few metres, tends to support the validity of the data obtained during the community sampling campaign, even if it had only one sample per station, due to the limited resources available.

4.3.3 Indications of Deterioration of Environmental Quality

Based on the TEC and REC values alone, the data indicates that cadmium and zinc could have adverse effects on aquatic fauna (see Chart 2-3 and Chart 2-10 in Appendix 2). Indeed, cadmium exceeds the REC at stations SD2-3 and SD4-10, as well as the TEC at station SD2-5. Zinc, on the other hand, exceeds the REC at the SD4-10 station.

If the ambient concentrations of NMG are included in the data analysis, notable increases in concentration, compared to the measured ambient concentration, can be seen on all graphs. Thus, at several stations, the concentrations of aluminum, barium, cadmium, chromium, copper, iron, manganese, nickel, sulphur, and zinc exceed the ambient levels, as well as the values of the SD-9 control station.

These findings indicate a possible deterioration in sediment quality due to increases in the concentrations of these elements. Stations SD-1 and SD4-10, closely followed by station SD2-5, are the ones that clearly and most often demonstrate background noise exceedances. Several other stations also have exceedances for several parameters, but these are less systematic or less extensive. Table 2 below presents the selected results from a few stations and for a few elements whose exceedances are considered significant and multiple, compared to the control station, and seem to us to indicate a deterioration in the quality of the watercourses:

Total extractable elements (mg/kg)				**Control station**		
	SD-1	**SD2-3**	**SD2-5**	**SD-9**	**SD4-10**	**SD4-12**
Aluminum	4400	870	4100	2700	8200	2900
Barium	59	89	67	26	62	28
Cadmium	0,31	0,39	0,69	*nd	0,49	nd
Chromium	12	nd	4,3	3,4	12	7,4
Copper	4,1	5,7	8,4	1,8	5,3	2,6
Iron	12000	1800	3800	5100	24000	7000
Manganese	250	55	110	43	470	79
Nickel	11	2,7	7,3	3,3	9,1	5,7
Sulphur (% g/g)	0,015	0,71	0,59	0,037	0,055	0,014
Zinc	34	18	40	16	81	16

**nd = not detected (value below the detection limit)*

Table 2

Stations for which many significant exceedances[33] (concentration at least 50% higher than the control station) were recorded - these exceedances which are considered significant are indicated in red

33 We have arbitrarily defined as "significant" any exceedance corresponding to a value of at least 50% higher than the value of the control station for each corresponding element.

As mentioned above, it should be remembered that all these elements are naturally present in the Earth's crust and are an integral part of the site's geology.[34] Sulphur was added to the nine metals here, partly because the increases in its observed concentration seem significant to us, and partly because the rock that NMG plans to extract is a rock containing significant amounts of sulphides, which are sulphur-based minerals with the potential to generate acid mine drainage (AMD).[35]

In this regard, NMG specifies in its analysis documents that in addition to the acidity generated by sulphides, cadmium, copper, nickel, and zinc, there are potentially leachable elements which come from the rock that the company wishes to extract.[36]

The sharp increase in the concentration of sulphur in some samples, like that of the nine metals identified in the previous table – including cadmium, copper, nickel, and zinc, which NMG identifies as leachable metals in the rock it wishes to extract – tends to indicate that an influx of sludge, dust, or rock fragments has occurred into the watercourses, and this influx appears to us to be most likely caused by the company's exploration activities.

It should be noted, however, that the small number of samples and the absence of standard deviations due to the limited resources of the community sampling campaign do not allow us to determine with complete certainty the causes of these increases in concentrations of elements observed in the sediments of aquatic environments. The sampled environment is effectively one that is subject to various anthropogenic forces. However, it is thought that these other forces tend to be one-off and of lesser magnitude, when compared to mining operations. In addition, the fact that elements naturally present in the site's geology were essentially retained was specifically intended to limit the risk of observing variations in concentrations due to sources of impact other than the mining activities.

With respect to the presence of sulphur in the samples, the analyses carried out do not provide details regarding the exact nature of the sulphur present. Since we do not know the form of sulphides present in the samples, we cannot conclude that its presence could generate DMA, or acidity, in the watercourses.[37] Nevertheless, there is an increased amount of sulphur in the sediments, and it is clear that this could originate from the mining exploration activities

34 MELCC, REE. (April 2019b). PR3.3 Impact Study – Volume 3, Matawinie Mining Project, SNC-Lavalin for Nouveau Monde Graphite. Appendix 4-3 Redevelopment and Restoration Plan – Matawinie Project (see in particular: p.250-254 $_{PDF,}$ and p.374 $_{PDF}$ et seq.).

35 It is in order to address this problem that NMG proposes to store its tailings and waste rock in co-disposal cells, making it possible to limit the risks of acid leaching of the extracted materials. See in particular: MELCC, REE, April 2019a, op. cit., Section 4.6 Management of waste rock and tailings, p.208 $_{PDF}$ et seq.

36 Ibid., pp.219-225 PDF and table 4-31 on pp.228 and 229 PDF; as well as table 4-36, p.248 $_{PDF}$.

37 For more details on the generation of acid mine drainage: Markewitz, Karine. (March 2003). Interactions of mine tailings and leachate from a deinking by-product cover in the context of acid mine drainage control, University of Sherbrooke, Faculty of Engineering, Department of Civil Engineering, Sherbrooke (Quebec), Canada, p.4-8.

carried out on the NMG site, due to the notable presence of sulphur-rich minerals (pyrite, pyrrhotite, etc.[38]) in the rock of the graphite deposit extracted by NMG.

Finally, it should be noted that we have included, in Appendix 3 of this report, two maps produced by the Society Against Pollution (SVP) that provide a precise visual overview of the organization of the community sampling campaign and some of the conclusions that can be drawn from it.

These maps show the location of the excavation site facilities that supplied ore to the pilot plant during the pre-production phase, as well as the location of the drilling conducted to the west of the mining site. These maps also show the exact location of the SD2-5 and SD-9 community sampling stations (the community control station), as well as the NMG "Sed-Witness" control station.

On the first of the two maps (Figure 3-1 in Appendix 3), six graphs are juxtaposed to present the levels of various elements at the SD2-5 station as well as at the control stations of the community monitoring initiative and NMG. The graphs have been inserted after the maps for clarity (Chart 3-1 to Chart 3-6 for the first map, and Chart 3-7 and Chart 3-8 for the second). The first row of graphs shows the levels of manganese, barium, strontium, and zinc found. The second row shows the levels of lead, copper, nickel, and chromium. The third row shows the cadmium and lead levels of the sediments at these stations (SD2-5 and control stations).

On the second of the two maps (Figure 3-2 in Appendix 3), the levels of cadmium, chromium, copper, manganese, mercury, nickel, lead, and zinc are represented using a logarithmic scale graph. This type of scale is useful when the data presented is of varying degrees of magnitude: it allows us to illustrate all the concentrations we are interested in (ranging from 0.015 mg/kg to about 110 mg/kg) on a single graph, which remains visually appealing. This second figure is essentially intended to provide a summary of the information presented in the first map.

Using this map showing the community sampling we can make the following observation: these graphs, correlated - with the help of the maps - to the location of samples situated downstream of mineral exploration drilling, tend to demonstrate that the proximity of the sampling station to the company's exploration activities contributes to measuring a significant increase in the concentrations of barium, cadmium, chromium, copper, manganese, mercury, nickel, lead, strontium, and zinc in the natural environment, based on results obtained at station SD2-5.

This reflects the analysis we presented earlier, using the graphs in Section 4.3.1 and Table 2. At that point, we also chose to include aluminum and iron in our analysis, and we excluded mercury, lead, and strontium due to a lack of sufficient data for all the stations. Notwithstanding the differences in the datasets used, the observed trend is, however, similar to what is shown in the SVP maps: the stations closest to the mining work areas, or the stations located in a watercourse draining directly from

38 MELCC, REE, (April 2019b), op. cit., p.312 $_{PDF}$

drilled areas, also seem to be those with the highest concentrations of heavy metals and various other elements (notably SD1-1, SD2-3, SD2-5, and SD4-10).

4.4 Summary of Results

In summary, the presence of cadmium at station SD2-5 appears to be the most problematic, since the concentration measured during the community sampling project exceeds not only the ambient level but also the TEC. In addition, at station SD4-10, nine (9) metals significantly exceed the ambient concentrations in the sediments (Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Zn), which strongly supports the hypothesis that the exploratory work has left material traces in the CE22 watercourse.

Several other watercourses appear to have been affected by the exploratory work. In fact, several metals including sulphur exceed the ambient concentrations in the other watercourses where samples of sediments were taken around the drilling area, namely CE23 (station SD4-12), CE25 (station SD1-1), and CE36 (stations SD2-3 to 8).

Based on the NMG data given in section 4.2 (2018 campaign), it is also possible to conclude that the Eau Morte stream was affected by the exploratory work. Indeed, exceedances of the NMG control station (Sed-Witness) occurred for twelve (12) metals (Al, Ba, Cr, Co, Cu, Fe, Li, Mn, Ni, Sr, V, and Zn) at one and/or the other of the stations in the Eau Morte stream where samples were taken.

4.5 Nouveau Monde Graphite's comments on these results

Prior to the publication of this report, we provided NMG with the results of the analysis from the Veritas accredited laboratory, along with the GPS coordinates of the sampling locations. We invited the President and Chief Executive Officer of the company to comment on these results and to tell us whether the company judges that its activities carried out on the Matawinie mining project site before and during 2021 are responsible for the data obtained and for certain exceedances of the REC and TEC criteria observed.[39] The following is a summary of the response received from the company and some additional comments that we would like to make with respect to these comments.

4.5.1 Comments from Nouveau Monde Graphite

Firstly, NMG highlights having communicated with Ms. Juliette Mousseau and Mr. Joseph Rondeau, both citizens of Saint-Michel-des-Saints, regarding contamination issues deemed to be of concern by these two individuals, during the public hearings on the Matawinie project held in 2020.[40] In summary, the issues from their report that concern us here include a "discovery in stagnant sections of streams originating on or near the site of the mine [...] large

39 See in the Appendix our letter entitled "Invitation to comment on the results of community sampling carried out on the periphery of the Matawinie project site in 2021", addressed by the signatories of this report on November 5, 2024, to the President and Chief Executive Officer of Nouveau Monde Graphite.
40 Mousseau, Juliette; Rondeau, Joseph. (February 20, 2020). Report on the Matawinie Project.

quantities of water and rusty mud [...]"[41] The argument put forth by Ms. Mousseau and Mr. Rondeau is based on inspection reports written and samples collected by the Centre de Contrôle Environnemental du Québec (CCEQ) and on the fact that water quality analyses conducted by Nouveau Monde Graphite in 2016 and 2017 did not detect such anomalies.[42]

NMG refers to this report to reiterate its response submitted during the hearings, which can be summarized as follows: according to the company, "NMG's demonstration project activities are not identified as the cause of the high iron concentrations in the water"; [43] and, regarding the sampling conducted in 2016 and 2017: "[in accordance with] the water sampling protocols established (sic) by the MELCC and applied as part of the project, the samples are not taken from stagnant watercourse bays, but rather in the beds of watercourses to ensure the correct representation of the results". [44] This last statement allows NMG to conclude that "[w]hen water is sampled (sic) in stagnant areas and in the presence of observed phenomena (one of which is the high levels of iron in the water), as the authors of the report and the CCEQ (sic) did, it is normal to find much higher levels of dissolved iron. NMG's results in 2016 and 2017 taken (sic) under different circumstances and conditions cannot therefore be compared to those of 2019 (report and CCEQ) to draw common conclusions as made in DM71 [Ms. Mousseau's and Mr. Rondeau's report]."[45]

NMG then acknowledges that having analyzed the results provided by the signatories of this report, "some results exceed the reference values adopted as criteria for the evaluation of sediment quality in Quebec." However, the company states that "of [t]he samples (10) and of the 34 (sic) parameters analyzed per sample (sic), 7 out of 10 samples did not exceed any of the reference criteria for all parameters analyzed and one (1) sample slightly exceeded the TEC cadmium level (SD2-CE36-5)." They then add that this "exceedance remains relatively low, and the probability of a significant impact related to the mining site is unlikely, if we consider the background noise data from the Environmental Impact Study (sic) and the Social Impact Study (sic) (EIES)." This last statement is based on the fact that "the sediment background noise results obtained in 2016 (Table 8 of Appendix 5-4 Characterization of Surface Water and Sediment of Nouveau Monde Graphite's Environmental and Social Impact Study[46]), i.e. before Nouveau Monde

41 *Ibid., p.3.*
42 *Ibid., see in particular pages 9 and 10.*
43 Nouveau Monde Graphite. (April 8, 2020). Responses to the 3rd series of additional questions from the BAPE of April 2, 2020. Matawinie Mining Project, p.9-10. Response to question 7a.
44 *Idem.*
45 *Idem. Following the references to these past exchanges, the company emphasizes that their response to our request for comment could be forwarded to Ms. Mousseau and Mr. Rondeau to "address their concerns": Nouveau Monde Graphite, written response from the President and Chief Executive Officer, Eric Desaulniers to the Invitation to comment on the results of community sampling conducted around the periphery of the Matawinie project site in 2021, [email], November 7, 2024. The following unreferenced citations are also taken from this email response from NMG.*
46 MELCC, REE. (April 2019c). PR3.4 Impact Study - Volume 4, Matawinie Mining Project, SNC-Lavalin for Nouveau Monde Graphite. Appendix 5-4 Surface Water and Sediment Characterization – Sector Report, Table 8 Sediment Quality for Samples Collected from Lakes and Rivers in the Study Area in the Summer of 2016, (p.703-704 $_{PDF}$).

Graphite's activities on the Matawinie property, show that for cadmium in particular, the concentrations in all sediment samples were higher than the values obtained in all [our] samples, including the cadmium results for sample SD2-CE36-5."

Finally, NMG states that the results of the stations " SD-3 for cadmium and mercury, SD2-CE36-5 for mercury, and SD-4-10 for cadmium and zinc" are " between the REC reference value and TEC," but counters this with the fact that " the reference values obtained in sediments in the ESIA (2016) were higher than [the values] we obtained (sic) in 2021 for these same parameters." Following on from this, the company concludes: "[on] the basis of the historical data of the site and (sic) in 2021, natural concentrations in the sediments measured as part of the ESIA, were not exceeded, we do not consider that the results (sic) demonstrate that there is a source of contamination from the site."

4.5.2 Our Reflections on These Comments

From the outset, having read Ms. Mousseau's and Mr. Rondeau's report, we note that the previous discussion they had with NMG did not entirely relate to the same subject, as we understand that only the impacts of the NMG demonstration project were discussed at that time. Although our questions also concern the link between the activities of the demonstration project and possible deterioration of the aquatic environments bordering the mining site, the main focus of our study is on the potential impacts of the exploration work carried out by the company.

With respect to NMG's findings regarding the fact that various stations have exceedances of the TEC and REC criteria, we came to the same conclusions. However, we would like to return to the statement claiming that seven of our ten samples do not exceed any criteria "for the 34 (sic) parameters analyzed per sample, once again.(sic)". Firstly, we actually analyzed only 30 parameters per sample. Secondly, although it is true that no criteria are exceeded in terms of the results obtained for seven of these samples, this fails to take account of the fact that no criteria exist for 23 of the 30 parameters analyzed. Indeed, there are only TEC and REC criteria for sediment quality for arsenic, cadmium, chromium, copper, mercury, lead, and zinc. This is also the reason why we have instead agreed to compare our results to background noise data from community sampling and NMG's Eau Morte Creek sampling campaigns, while integrating criteria exceedances when these criteria exist, which is the standard practice in the field of environmental data analysis and the approach recommended in the *Guide on Criteria for the Evaluation of Sediment Quality in Quebec.*[47]

47 EC & MDDEP, 2007, 39 p., *op. cit*.

Regarding the 2016 reference values, presented in the company's ESIA, it seems to us that they cannot be used in our analysis, and therefore are irrelevant to this discussion, for the following two reasons. Firstly, as detailed in Table 8 of Appendix 5-4 to which NMG refers, and as confirmed on *Map 1*[48] of the same appendix, no sediment samples were collected in 2016 in the watercourses targeted by the community sampling campaign. Therefore, such "reference values" cannot be comparable to our results. Secondly, as NMG points out in its response to the concerns of Ms. Mousseau and Mr. Rondeau, it is important that the samples be taken "not in stagnant bays of watercourses but rather in the beds of watercourses to ensure accurate results".[49] Similarly, "from the moment that water sampling (sic) is conducted in stagnant areas and in the presence of observed phenomena [...], it is normal for the results obtained [...] to be more significant."[50]

However, it turns out that all of the sediment samples collected by NMG in 2016 came from lakes, where the water is relatively stagnant, in comparison to the riverbeds sampled by community members. Thus, to use the words of the company itself, "[t]he results of NMG in 2016 and 2017 taken (sic) under different requirements and conditions cannot therefore be compared [to our 2021 results] to draw common conclusions such as were made in [the response offered to us by Nouveau Monde Graphite]." [51] Simply put: we cannot rely on baseline data from lake sediment sampling by NMG in 2016 to assert that the concentrations in stream sediments in 2021 collected by community members are lower than the initial "reference values".

In response to the company's statement that the data collected by community members would not, at this time, demonstrate the existence of a source of contamination from the mining site, we would like to reiterate that according to our analysis, it is quite realistic, plausible, and even probable that the mining exploration work on the site, in particular, may have contributed to a real and observable deterioration in the state of watercourses.

4.6 Company Environmental Commitments

Contrary to what the results of the community sampling project indicate, the company currently prides itself on prioritizing the protection of natural environments and water in all of its operations.

Indeed, taken from a recent "Environment, Society and Governance" (ESG) report[52] addressed to its investors as well as to the general public, as part of the company's analysis of its practices in these three sectors, it is stated that: "[t]he protection of water is a top priority and one which we focus on and take very seriously".[53] In addition, the company claims to contribute,

48 *Ibid., Map 1, p.681* $_{PDF}$.
49 Nouveau Monde Graphite, April 8, 2020, op. cit.
50 *Idem.*
51 *Idem.*
52 Nouveau Monde Graphite. (May 10, 2023). ESG Report 2022, pp.26, 60, 61 and 62 PDF.
53 *IIbid, p.26* $_{PDF}$.

among other things, to the achievement of the United Nations (UN) Sustainable Development Goal (SDG) of "clean water and sanitation". And further on, in the same report, we can read NMG's commitments to "limit [its] environmental footprint, minimize [its] consumption of fresh water, and preserve water quality in order to avoid any significant impact on wildlife, ecological resources, and human health".[54] It also states that through "a system of ditches and basins, precipitation, surface and groundwater, that has potentially been in contact with the Phase 1 site [(the demonstration stage)] is collected and then directed to the collection and polishing ponds for treatment. Once compliant with regulatory standards, the water is returned to the environment via the Eau Morte stream"[55] Finally, according to NMG, a "robust water quality monitoring program has been established to ensure that [their] activities do not have any adverse effects on the receiving environment".

Although these commitments are honorable and desirable, significant doubt remains, according to the results of the community monitoring project, regarding NMG's ability to collect all the water "that has potentially been in contact with the phase 1 site" and to prevent any "harmful effects on the receiving environment."[56]

54 *Ibid*, p.61 PDF
55 *Ibid*, p.63 PDF
56 *Idem*.

5. COMMUNITY MEMBERS' EXPERIENCES

From a local resident's point of view, this sampling project highlighted the strengths and limitations of such community monitoring initiatives.

Indeed, the involvement of more than a dozen people, all more or less familiar with this type of activity, was facilitated by the simplicity of the rigorous sampling method. In addition, the efforts to popularize government sampling protocols previously carried out by the SVP have allowed local residents to fully embrace this scientific

© COPH, Matawinie mine site under construction

method, giving them confidence in the value of their contributions. That being said, limited funding and the heavy workload required to secure more funding soon re-

stricted the quantity and diversity of samples collected. This is one of the reasons why only sediment samples were collected, whereas it would have been ideal to collect water samples as well.

In addition, the fatigue and stress generated by the climate of social division surrounding the Matawinie project in Saint-Michel-des-Saints, and by the constant environmental vigilance by people concerned about potential threats to the integrity of the environment, turned out to be subtle but very real challenges that the individuals participating in the sampling project had to face.

Finally, the sometimes limited funds and availability of the various grassroots groups involved contribute to the precarity of such initiatives when they are carried out without the support of the government or the company behind the mining work.

In the event that the government recognizes the importance of such issues, we invite them to make funds available to support community initiatives aimed at preventing environmental contamination, such as this sampling project, to ensure independent community monitoring of industrial projects that have the potential to adversely affect the territory where these people live.

© COPH, Mine water management basins at the Matawinie mine site

6. CONCLUSIONS

The main goals of these community environmental monitoring projects were to:

- Determine whether exploratory work prior to the construction and operation of the mine may have contributed to the deterioration of the aquatic ecosystems bordering the mining site, and if so, to what extent;

- Double-check, in an analytical framework independent of the mining company, certain elements of the water body characterization studies commissioned by NMG as part of their environmental and social impact assessment.

The sampling and analysis work that followed identified cases of metal concentrations in the sediments, raising fears of adverse biological effects on aquatic fauna in various areas of the Matawinie site. In this community monitoring study, it was not possible to measure all environmental effects, so sediment quality was chosen as an indicator of the overall state of the environment, as this component has the characteristic of collecting and concentrating contaminants from surface water over time.

More specifically, a case of significant increase in cadmium concentration, compared to government criteria, was observed to the south of the explored site, in the CE36 watercourse. Significant exceedances of cadmium and zinc compared to the government criteria were also observed in the CE22 watercourse to the north of the site. In addition, numerous significant background exceedances were observed for several metals (Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, and Zn, in particular) at several sediment sampling stations. These observations suggest that NMG's exploration activities have indeed had effects, in the form of the addition of elements to the sediments, with a potential for contamination, in the watercourses CE22, CE23, CE25, and CE36, located to the north, west, and southwest of the mine site.

According to our analysis, community sampling has indeed made it possible to highlight the likely contribution of NMG's exploration activities to the deterioration of the aquatic ecosystems bordering the site, in addition to corroborating some of the reference data presented by the mining company in its environmental characterization studies.

Following an in-depth analysis of the data collected by NMG, we were able to correct the interpretation of the results related to the stations located in the Eau Morte stream. Indeed, it is clear that only the Sed-Témoin station will be able to serve as a comparative value for the environmental monitoring that will eventually be carried out by NMG, so as not to underestimate the environmental effects of industrial activities. This is demonstrated in Section 4.2.

This entire exercise, starting from the community sampling campaign carried out in 2021 and leading up to the writing of this report, has also allowed us to demonstrate some of the strengths of this type of approach, including the accessibility of the sampling method for everyone. However, it also revealed several challenges that com-

munity members may face in the context of such an initiative, including difficulties in finding adequate funding, the risks of being subjected to certain forms of social pressure, exhaustion, stress or anxiety, and possibly the deterioration of the social fabric of the environment in where this type of community monitoring project is promoted or carried out. Obviously, most of these challenges are, from the outset, attributable to the fact that the implementation of a mining project requires community members to understand the issues, as much as the sampling campaign itself.

6.1 Recommendations

In our view, many steps could be taken by different parties, including NMG, the provincial government, and the federal government.

Firstly, in the event that the mining company observes, and then acknowledges, that it has indeed harmed the integrity of aquatic ecosystems, or even potentially contaminated these environments in some cases, it seems imperative to us that it should apply the measures necessary to restore the impacted environments to their initial state, as soon as possible.

Secondly, it is essential that efforts are made by the provincial government to ensure the Ministry of the Environment has the capacity to fulfill its mandate. The Ministry of the Environment should be given increased powers and resources to ensure effective environmental monitoring of mining activities, beginning with the earliest exploratory phases of any mining projects. In parallel with this progressive - but hopefully rapid - strengthening of the ministry's powers, we believe that a budget to support community environmental monitoring initiatives should be made available to local residents who are faced with mining projects such those of NMG. This budget could be used to finance independent studies of the activities of mining companies, such as this community sampling project. Among other possible benefits, this would strengthen the government's environmental monitoring capabilities through the involvement of local communities. Additionally, it would allow for a better balance in the power dynamics currently favoring mining companies and, consequently, establish a stronger foundation for holding constructive dialogue around their major projects. Since such a budget would be used to monitor mining operations, and in accordance with the polluter-pays principle enshrined in the Sustainable Development Act, it seems logical to us that mining companies would subsidize such a fund, without the community members who will benefit from it having to report to them, in order to maintain the independent nature of these initiatives.

Similarly, we propose that the Ministry of the environment should dispatch experts to the site to cross-check the data and conclusions produced by NMG and the current community analysis of the mining site, considering, in particular, that probable cases of damage to the integrity of aquatic environments have been identified, and that the company's baseline data does not seem to reflect the condition of the site prior to the commencement of mineral exploration activities. The Ministry should also be particularly uncompromising in the face of

possible exceedances of the requirements, considering the fact that the federal Metal and Diamond Mining Effluent Regulations (MDMER) do not regulate the discharge of mine water from graphite mines.

Additional parameters such as petroleum hydrocarbons, generated by machinery, and nitrogen compounds produced by blasting activities could be integrated into future sampling and monitoring initiatives at this site.

At the federal level, we strongly recommend that the government expand the scope of the MDMER to regulate all types of mining operations, including the extraction of graphite or any other non-metallic element that is currently outside the framework, monitoring, and environmental oversight imposed by the MDMER. This is of critical importance since graphite is presented as a cornerstone of the energy transition that Canada and Quebec are currently trying to achieve. It is therefore likely that graphite mining projects will become widespread in Canada. In this context, it is important to ensure that we have robust and adequate mechanisms in place to supervise and prevent the possible negative impact of the various components of these large-scale mining projects.

In the event that financial resources are available and individuals are available and willing to carry out such work, we also recommend the continuation of community sediment sampling work throughout the development of the Matawinie project, in order to monitor how the condition of the various watercourses is affected. Similarly, it seems sensible to sample the watercourses around the demonstration plant currently in operation, as well as the sediments of Lac aux Pierres bordering the site. In conjunction with these additional samplings, it would be appropriate to continue following the documents produced by NMG.

Finally, if proposed budgets allow, it would be useful to sample surface waters as well, including those of Lac aux Pierres, and to add other control stations in order to refine the accuracy of the background noise measurement.

APPENDIX 1

Sediment quality of the Eau Morte stream – Data Characterization conducted by Nouveau Monde Graphite

Parameter	LD[1]	CER[2]	CSE[2]	Station EXP1	Station EXP2[3]	Station EXP3[3]	Control Station[3]
Total Extractable Metals (in *mg/kg*)							
Aluminum (Al)*	10			1000	7840	1860	**1338**
Barium (Ba)*	1			11	103	16,1	**14,1**
Cadmium (Cd)*	0,1	0,33	0,6	0,05	0,05	0,05	**0,05**
Chromium (Cr)*	2	25	37	1	14.8[4]	2,0	**1,2**
Cobalt (Co)	0,1			0,78	5,92	1,3	**1,04**
Copper (Cu)*	1	22	36	0,5	8,0	1,32	**0,82**
Iron (Fe)*	10			1640	13980	4360	**2940**
Lithium (Li)	3			1,5	6,4	2,1	**1,9**
Manganese (Mn)*	1			31	243	76,8	**46,2**
Nickel (Ni)*	0,5	*ND*	*ND*	1,5	12,0	2,2	**2,3**
Sulfur (S) (in % g/g)*	0,01			0,01	0,01	0,01	**0,02**
Strontium (Sr)	1			1,7	9,8	4,1	**1,5**
Vanadium (V)	1			3,28	22,4	6,1	**4,1**
Zinc (Zn)*	2	80	120	8,1	40,4	11,9	**13,4**

1. LD: Detection limit of the analysis
2. CER: Concentration of rare effects; CSE: Concentration threshold producing an effect
3. Represents the average of 5 samples. For the calculation of the average, half the LD value was used for samples with results below the LD.
4. Exceedance of the CER for one of the samples from this station (26 mg/kg)

Table 1-1

Sediment quality of the Ruisseau à l'Eau Morte - Additional data characterization from 2018 carried out by Nouveau Monde Graphite (adapted from Table 5-23 of the Environmental and Social Impact Assessment carried out by Nouveau Monde Graphite: only the data relevant to the comparison with the results of Table 2 of section 4.2 of the report, as well as the data mentioned in sections 4.2 and 4.3, have been reproduced in this table). The red data indicates an exceedance from the "Witness Station" to the "EXP" stations. Items marked with an asterisk (*) are those that are graphically represented and discussed further in this report.

57 Ministry of the Environment and the Fight Against Climate Change, Environmental Assessment Registry. (April 2019a). PR3.1 Impact Study - Volume 1, Matawinie Mining Project, SNC-Lavalin for Nouveau Monde Graphite, Chapter 5 - Environmental Description, p.349 PDF.

APPENDIX 2

Appendix 2 – Results of analysis of community sampling of watercourses potentially impacted by Nouveau Monde Graphite's (NMG) mineral exploration activities and comparison with background data as measured by NMG

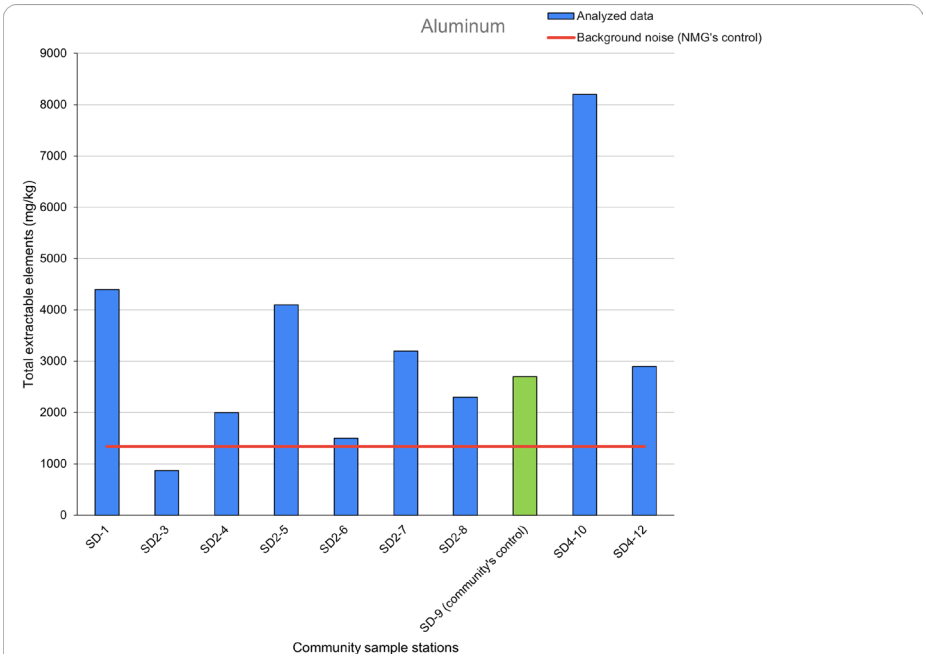


Chart 2-1

Aluminum Concentrations Measured at Community Sampling Stations

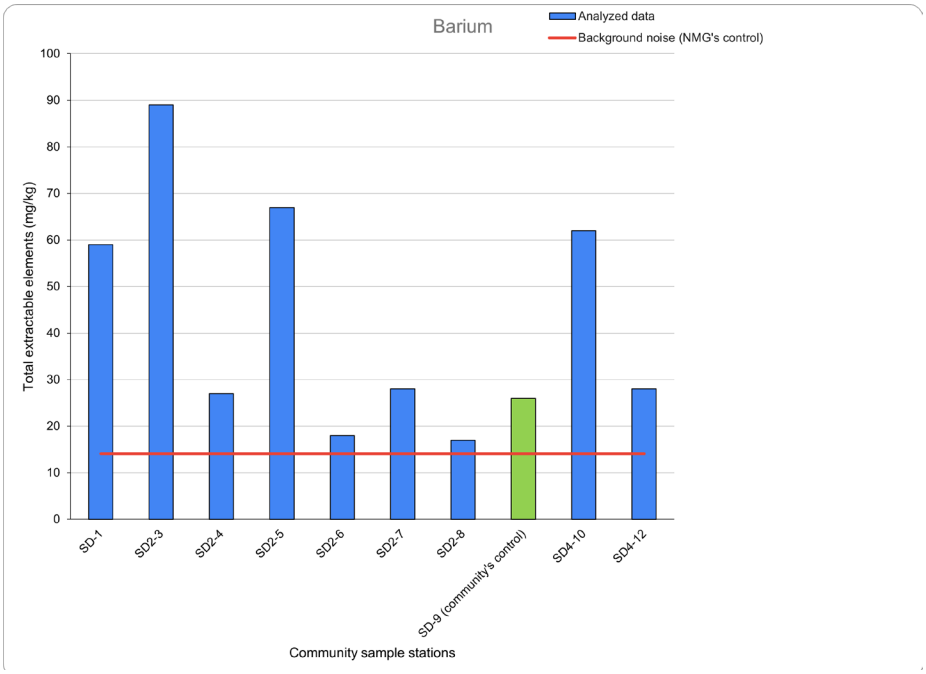


Chart 2-2

Barium Concentrations Measured at Community Sampling Stations

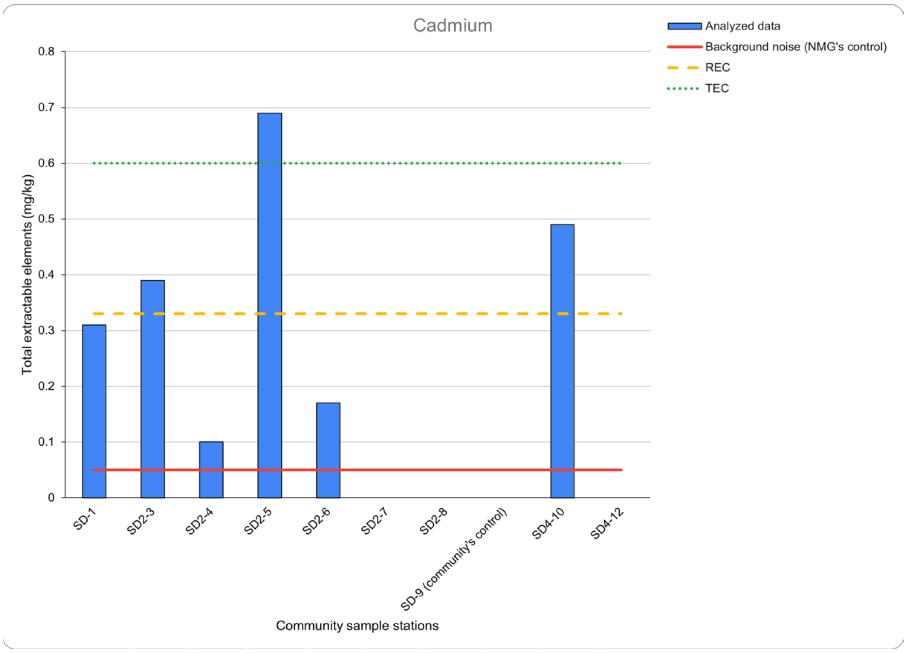


Chart 2-3

Cadmium Concentrations Measured at Community Sampling Stations

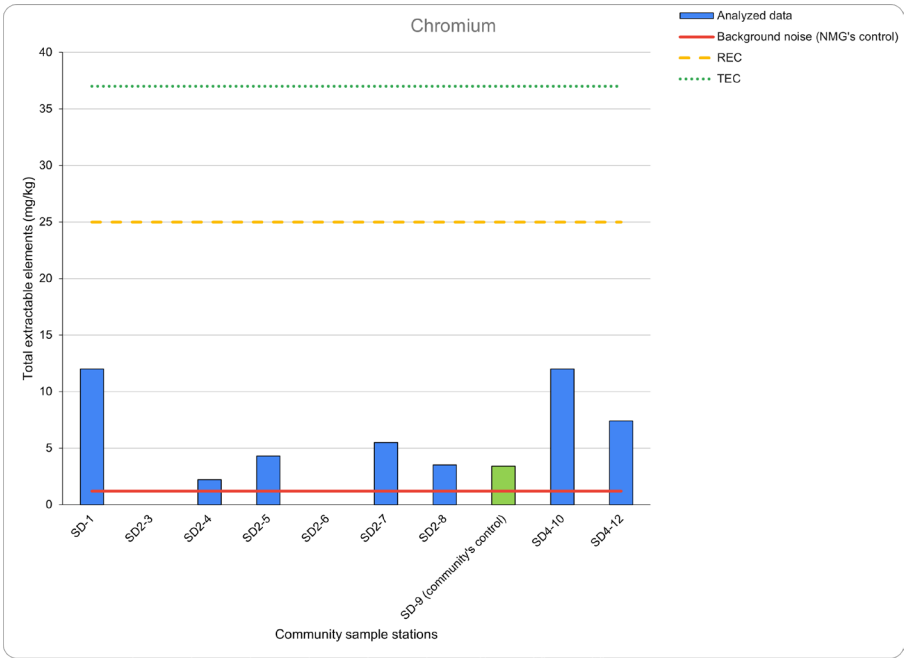


Chart 2-4

Chromium Concentrations Measured at Community Sampling Stations

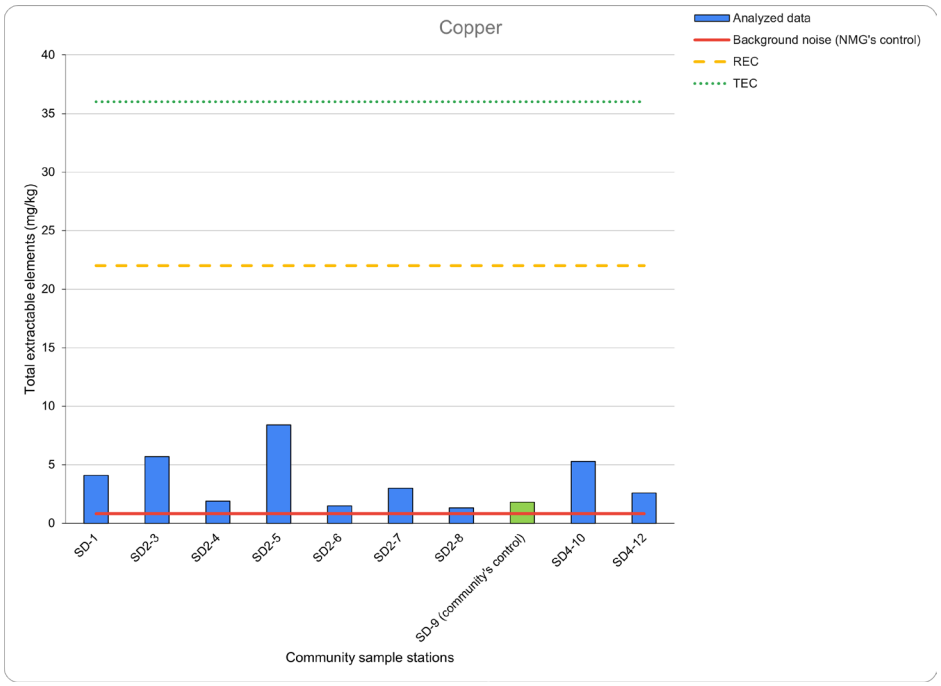


Chart 2-5

Copper Concentrations Measured at Community Sampling Stations

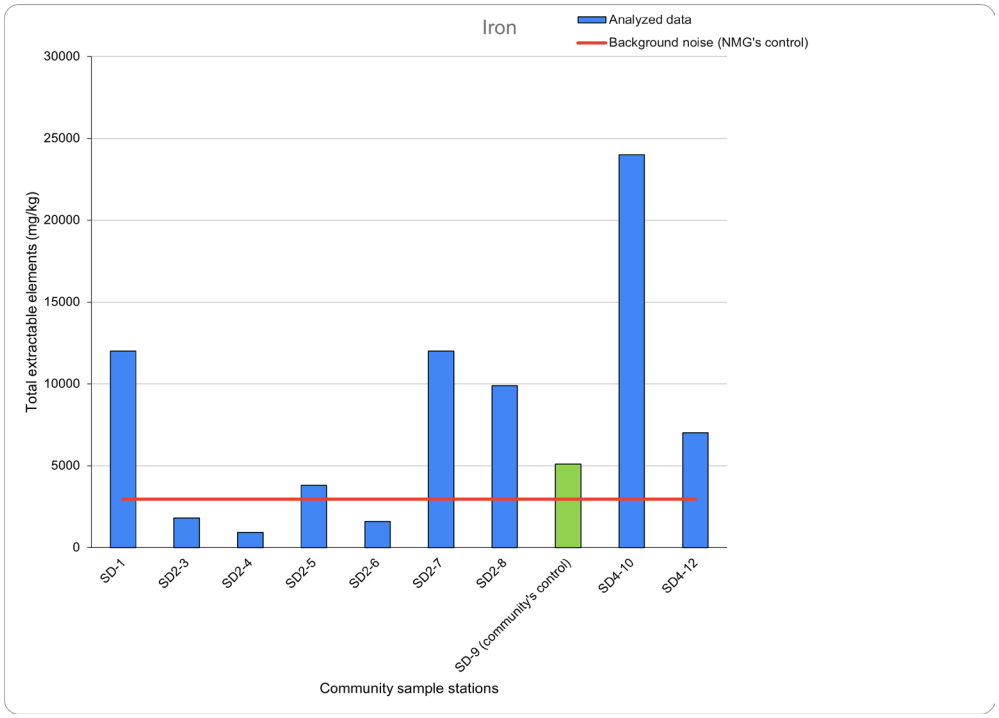


Chart 2-6

Iron Concentrations Measured at Community Sampling Stations

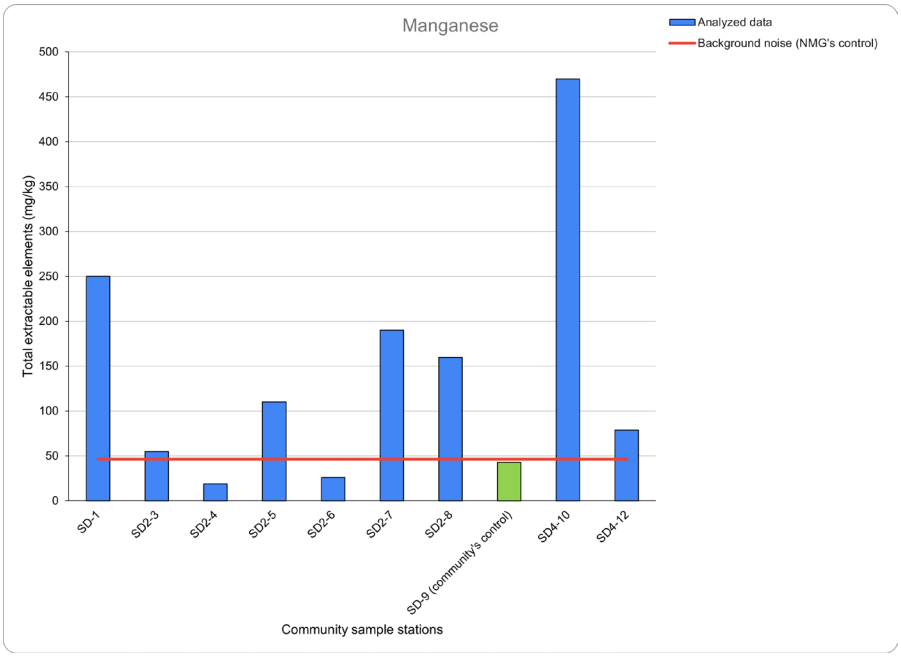


Chart 2-7

Manganese Concentrations Measured at Community Sampling Stations

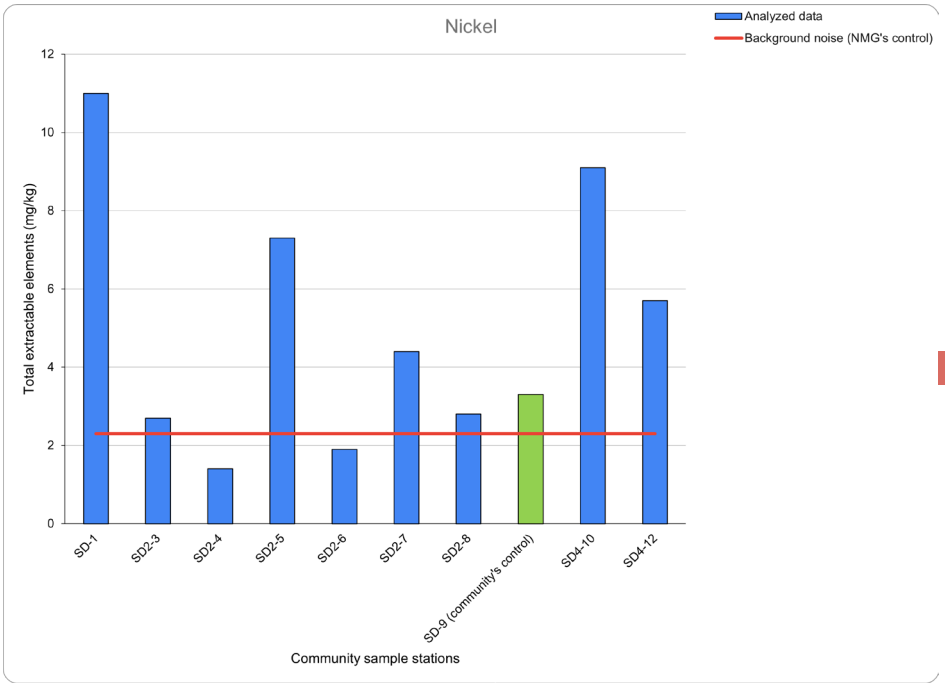


Chart 2-8

Nickel Concentrations Measured at Community Sampling Stations

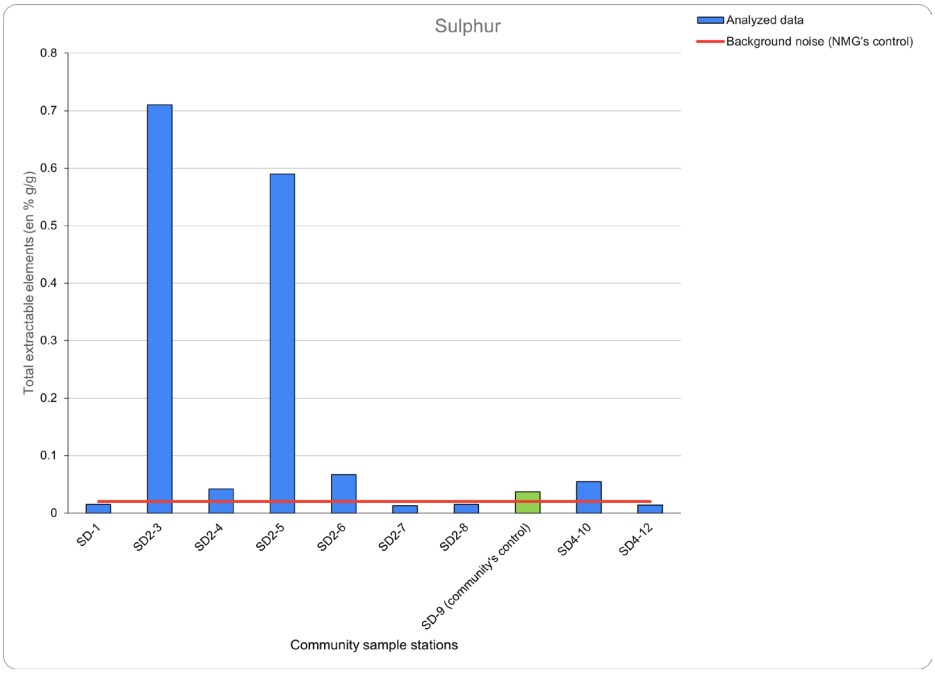


Chart 2-9

Sulfur Concentrations Measured at Community Sampling Stations

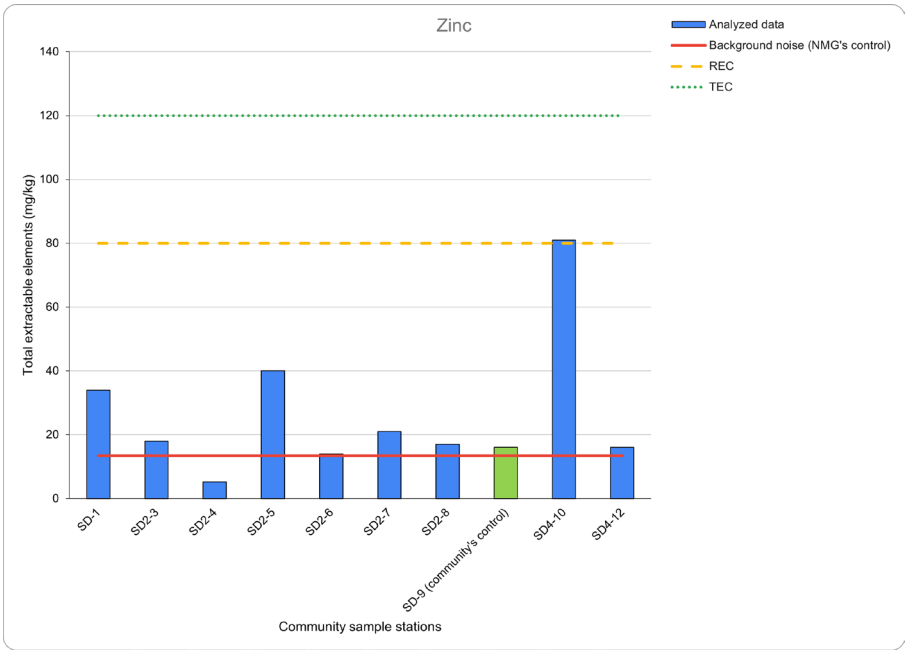


Chart 2-10

Zinc Concentrations Measured at Community Sampling Stations

APPENDIX 3

Results of the analysis of the community sampling at station SD2-CE36-5 and comparison of the Nouveau Monde Graphite control stations with that of the community sampling

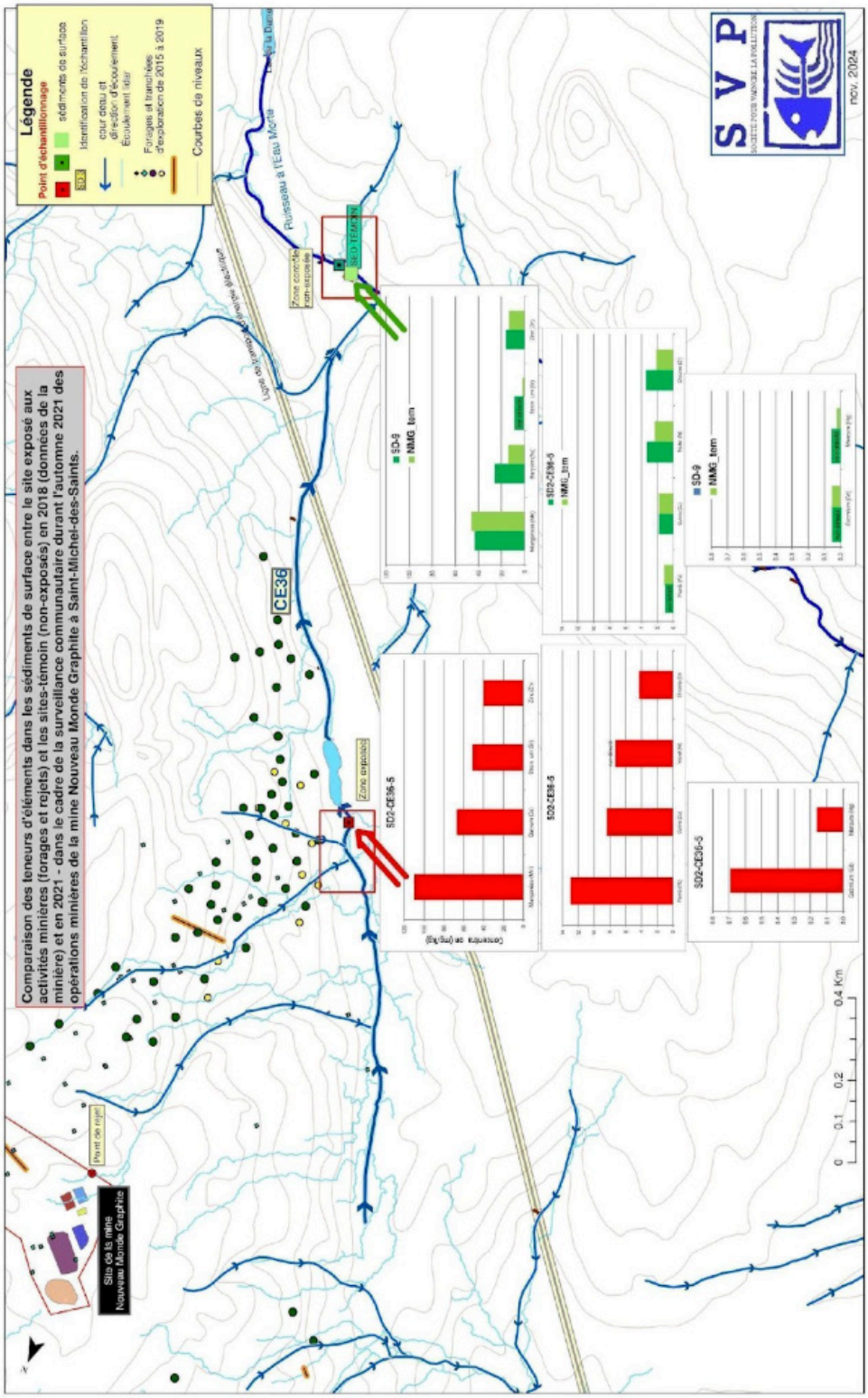


Figure 3-1

Comparison of element levels in surface sediments between the site exposed to mining activities (drilling and discharges) and the control sites (not exposed) in 2018 (mine data) and in 2021 – as part of the community monitoring during the fall of 2021 of the mining operations of the Nouveau Monde Graphite mine in Saint-Michel-des-Saints (SVP, 2024). Comparison of elements from sample SD2-CE36-5 (in red, on the left) and control samples from NMG (in dark green) and the community campaign (in light green).The graphs opposite are reproduced for visual clarity. The elements represented are, in the graphs at the top: cadmium and mercury; graphs in the middle: lead, copper, vanadium, nickel, chromium; in the bottom graphs: manganese, barium, strontium, zinc.

58 Map produced by the Society Against Pollution, November 2024.

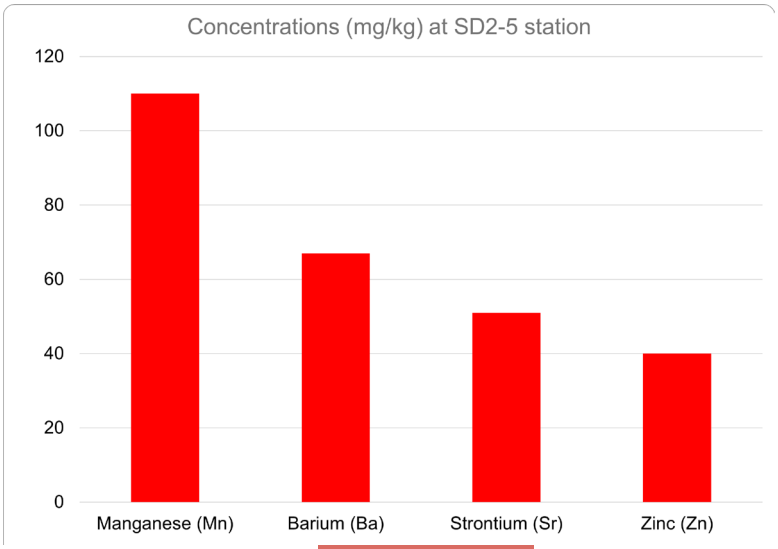


Chart 3-1

Concentrations (in mg/kg) of manganese, barium, strontium and zinc at the SD2-5 community sampling station.

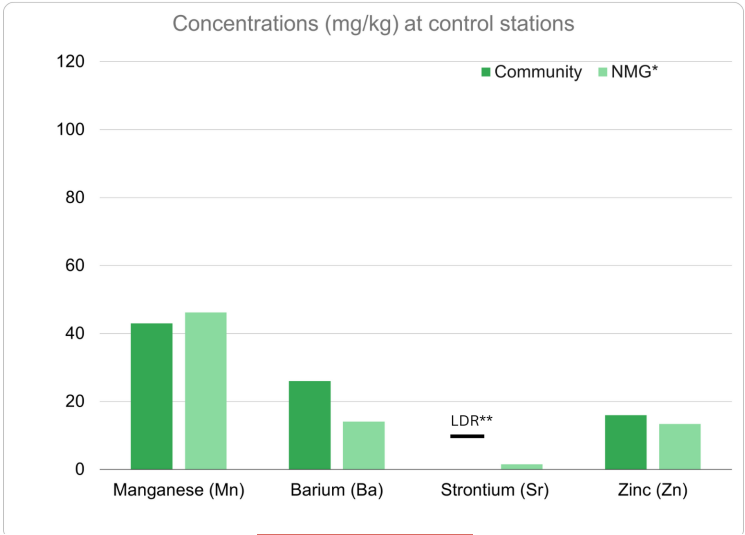


Chart 3-2

Concentrations (in mg/kg) of manganese, barium, strontium, and zinc at the monitoring stations of the community sampling project (SD-9 station, in dark green) and Nouveau Monde Graphite (NMG, in light green).

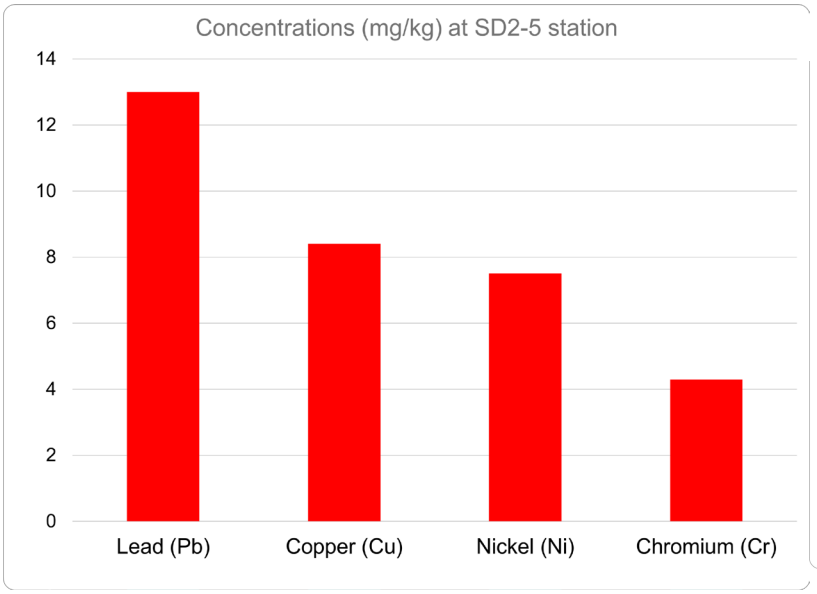


Chart 3-3

Concentrations (in mg/kg) of lead, copper, nickel, and chromium at the SD2-5 community sampling station.

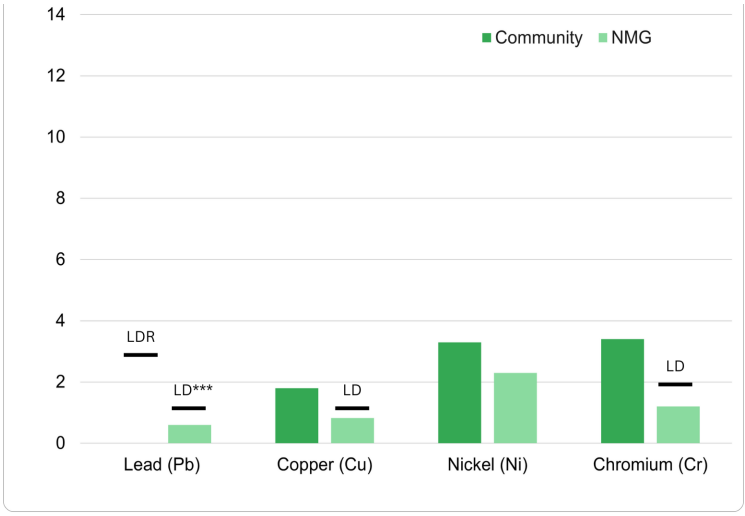


Chart 3-4

Chart 3-4 - Concentrations (in mg/kg) of lead, copper, nickel, and chromium at the control stations of the community sampling project (SD-9, in dark green) and NMG (in light green). Note that the result is below the detection limit for lead in community sampling, and for lead, copper, and chromium in the NMG results.

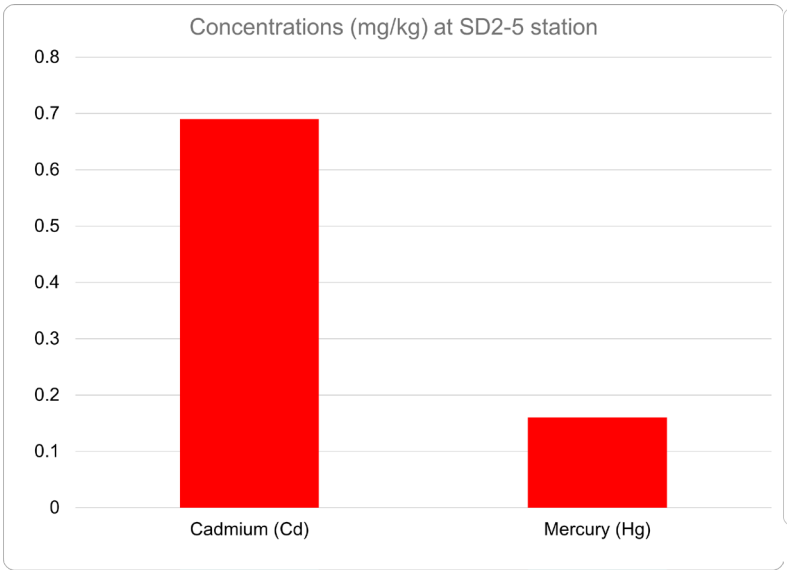


Chart 3-5

Chart 3-5 - Concentrations (in mg/kg) of cadmium and mercury at the SD2-5 community sampling station.

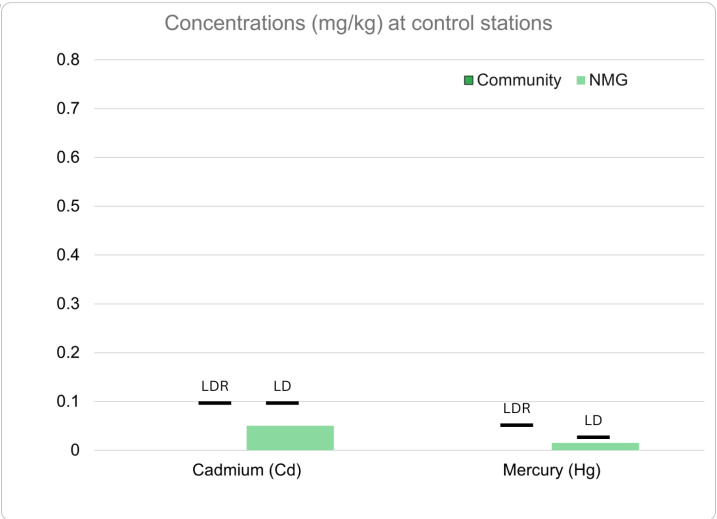


Chart 3-6

Cadmium and mercury concentrations (mg/kg) at the community sampling (SD-9, dark green) and NMG (light green) control stations. Note that all results in this graph are below the detection limit.

Notes:

* NMG results: represent the average of 5 samples. For calculating the average, a value at half the detection limit was used for samples with results below the detection limit.

** RDL: Reported Limit of Detection. Used in the analysis of community sampling results.

*** LOD: limit of detection. Used in the an alysis of NMG results.

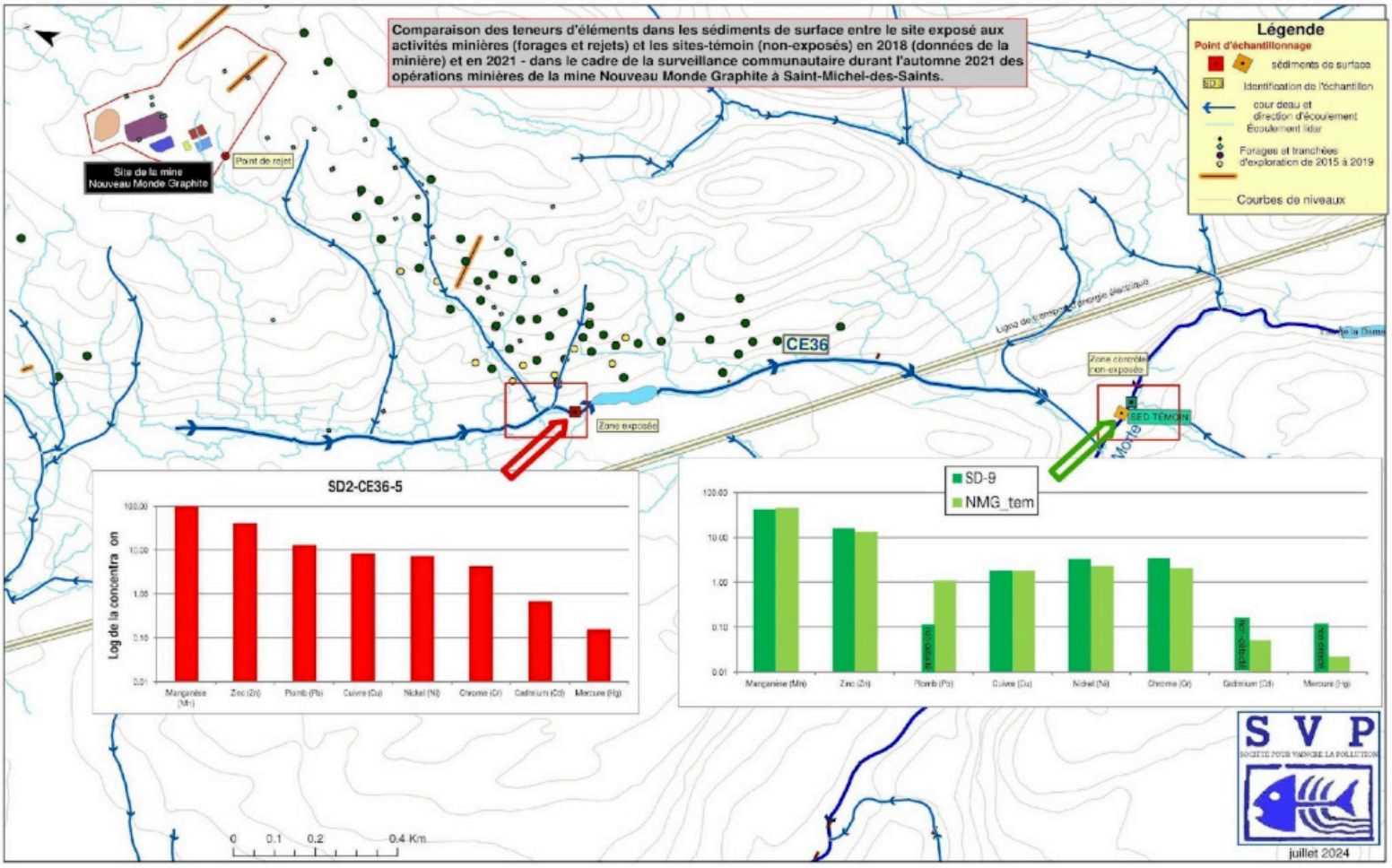
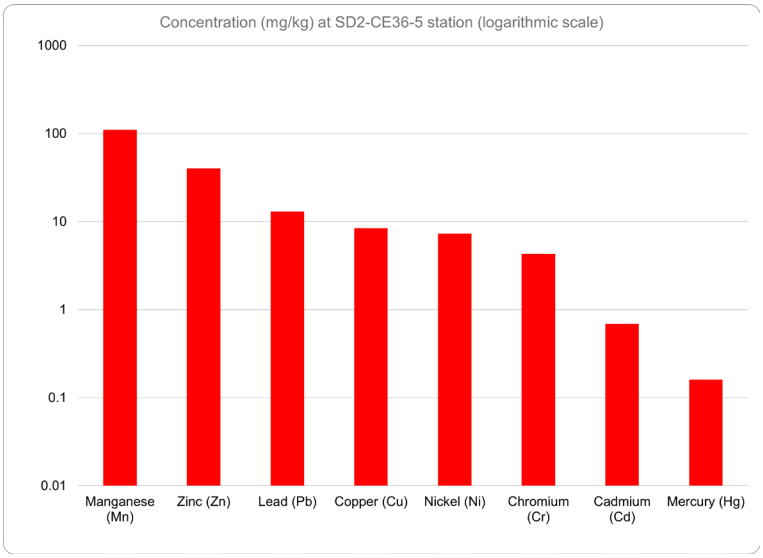


Figure 3-2

Comparison of elemental levels in surface sediments between the site exposed to mining activities (drilling and discharges) and the control sites (not exposed) in 2018 (mine data) and in 2021 – as part of the community monitoring during the fall of 2021 of the mining operations of the Nouveau Monde Graphite mine in Saint-Michel-des-Saints (SVP, 2024). Comparison, at the logarithmic scale, of the SD2-CE36-5 sample (in red, on the left), to the control samples of NMG (in dark green) and the community campaign (in light green). The graphs opposite are reproduced for visual clarity. The elements represented graphically are, from left to right: cadmium, chromium, cobalt, copper, manganese, mercury, molybdenum, nickel, lead, zinc. The concentrations represented (on the vertical axis of the graph) are, from top to bottom: 100, 10, 1, 0.1 and 0.01

59 Map produced by the Society Against Pollution, July 2024.



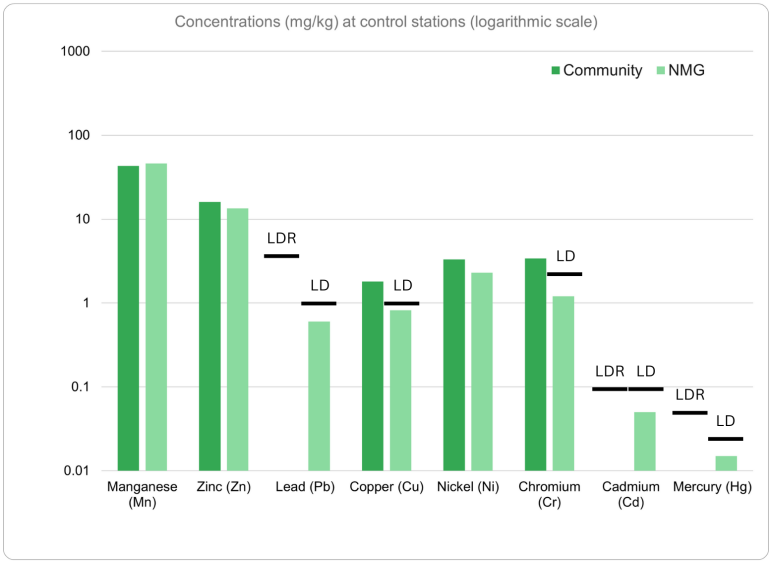


Chart 3-7

Concentrations (mg/kg) of manganese, zinc, lead, copper, nickel, chromium, cadmium, and mercury at the SD2-5 community sampling station. Results presented on a logarithmic scale.

Chart 3-8

Concentrations (in mg/kg) of manganese, zinc, lead, copper, nickel, chromium, cadmium, and mercury at the community sampling (SD-9, dark green) and NMG (light green) control stations. Results presented on a logarithmic scale. Note that the results of the community analysis are below the detection limit for lead, cadmium, and mercury, and the NMG results are below the detection limit for lead, copper, chromium, cadmium, and mercury. A correction to the representation of the NMG data has been made to the lead, copper, and chromium results relative to the graph shown in Figure 3-2 above.

APPENDIX 4

Exchanges between our organizations and Nouveau Monde Graphite regarding the results of the community sampling campaign

The *invitation to comment on the results of community sampling carried out on the periphery of the Matawinie project site in 2021* is shown below. This was sent to the President and CEO of Nouveau Monde Graphite by our organizations (Société pour vaincre la pollution, Eau Secours, MiningWatch Canada) :

> Dear Mr. Desaulniers,
>
> Please find attached, the results of the analysis obtained from the Bureau Veritas laboratory following the community sampling carried out in the waterways bordering your Matawanie project mining site. We would like to invite you to comment on the results obtained.
>
> This sampling campaign was a response to community concerns expressed in the early stages of development of the Matawinie project and which still persist. It aims to establish whether the exploration and excavation work on a smaller pit that you carried out before or in 2021 could have had a negative impact on the waterways flowing in or around your mining site. Samples of sediment were taken from these waterways, downstream from your site, and were sent for analysis to an accredited laboratory.
>
> Having analyzed all the data obtained, we now plan to publish our report on the subject. However, we believe it is important to invite you to comment on this data, so that we can take your feedback into account. We note that some data exceeds the benchmarks on which similar government analyses would be based, namely the threshold effect concentration (TEC) and/or the rare effect concentration (REC).[60] We wish to establish if your activities are responsible for these criteria being exceeded.
>
> You may understand that our report will reflect this situation, hence our interest in obtaining your comments before it is published.
>
> Attached you will find the raw data as provided to us by the accredited laboratory we have engaged, and a list of the GPS coordinates of the points where the samples were collected. Our objective remains to ensure that the territory and its inhabitants are protected, and that respect for the integrity of ecosystems remains a priority in the development of any mining project starting from the mining exploration stag-

60 Environment Canada and Quebec Ministry of Sustainable Development, Environment and Parks, 2007. *Criteria for the evaluation of sediment quality in Quebec and framework application: prevention, dredging, and restoration*. 39 pages.

es. We would appreciate if you could forward your written comments within the next seven (7) days, i.e. by Tuesday, November 12. If you do not wish to comment on this data, we would be grateful if you could notify us as soon as possible.

Thank you for your attention to this matter. Yours sincerely,

[signatures]

Below, the written response of the President and Chief Executive Officer, Éric Desaulniers, to the Invitation to comment on the results of community sampling carried out on the periphery of the Matawinie project site in 2021, opposite, is copied as received, apart from the footnotes that we have added:

Hello Mr. Cloutier-Brassard,

We have taken note of the results of the 2021 surface water sediment sampling campaign, conducted on the periphery of the mining site by the organizations Eau Secours, MiningWatch Canada, and SVP (Society Against Pollution), which you have forwarded to us.

I shared the results with my team, including our VP of Environment & Sustainable Infrastructure, Martine Paradis, who told me that she had spoken with Ms. Juliette Mousseau and Mr. Joseph Rondeau at the open house for the Hydro-Québec line on October 24, 2024, and that they were disappointed with the response received during the public hearings in 2020 from Nouveau Monde Graphite (brief DM71_P and Appendices with their observations submitted to the CCEQ).[61] The answer (no. 7) issued following the submission of their brief is attached.[62] We will then be in a position to send them the response we are providing to you here, in order to address their concerns.

We have compiled the results analyzed in a certified laboratory of your sediment metal sampling campaign around the site or future mine site in 2021. Subject to the analytical methods and sampling techniques that we have not been able to verify (section 5.1 of the reference document named below), the representativeness of the samples, the laboratory's notes on detection limits, and the analysis deadlines indicated in your certificates of analysis, we have noted that some results exceed the reference values adopted as criteria for the evaluation of sediment quality in Quebec (Environment Canada and Quebec Ministry of Sustainable Development, Environ-

61 Mousseau, Juliette; Rondeau, Joseph. (February 20, 2020). DM71_P Report on the Matawinie project, online.

62 The response referred to here can be found in the document attached to the email received, namely: Nouveau Monde Graphite. (April 8, 2020). DQ20.1 Answers to the 3rd series of follow-up questions from BAPE of April 2, 2020, online.

ment and Parks, 2007). Criteria for the evaluation of sediment quality in Quebec and application frameworks: prevention, dredging, and restoration. 39 pages).

To ensure the protection of aquatic life, the Canadian Council of Ministers of the Environment has established two reference values for freshwater and marine sediments for approximately thirty chemical substances. These reference values are defined by a Threshold Effect Concentration (TEC) and a Probable Effect Concentration (PEC). These two reference values have been retained among the new sediment quality criteria, but are not sufficient to determine all the thresholds necessary for sediment management in Quebec in a variety of contexts. Three other quality criteria were subsequently included in the database by the Canadian Council of Ministers of the Environment : Rare Effect Concentration (REC), Occasional Effect Concentration (OEC), and Frequent Effect Concentration (FEC). Used in conjunction with natural levels, these criteria can prevent contamination of sites that are vulnerable to inputs of anthropogenic contaminants.

Of your samples (10) and of the 34 parameters analyzed per sample, 7 out of 10 samples do not exceed any of the reference criteria for all parameters analyzed, and one (1) sample slightly exceeds the cadmium TEC (SD2-CE36-5). When the concentration of one or more substances is above the TEC (Class 3), the probability of observing adverse effects on benthic organisms increases with the measured concentrations. In this case, the only sample that exceeds the TEC is sample SD2-CE36-5 where the TEC limit is 0.6 mg/kg and there is a measured concentration of 0.69 mg/kg. This exceedance remains relatively low, and the probability of a significant impact related to the mining site is unlikely, if we consider the background noise data from the Environmental and Social Impact Assessment (ESIA). In fact, the background sediment results obtained in 2016 (Table 8 of Appendix 5-4 Characterization of Surface Water and Sediment of Nouveau Monde Graphite's Environmental and Social Impact Study), i.e., before Nouveau Monde Graphite's activities on the Matawinie property, show that for cadmium in particular, the concentrations in all sediment samples were higher than the values obtained in all your samples, including the cadmium results for sample SD2-CE36-5.

Then, for the following samples, results are recorded between the reference value of the REC and the TEC; i.e. SD-3 in cadmium and mercury, SD2-CE36-5 in mercury, and SD-4-10 in cadmium and zinc. When the concentration of one or more substances exceeds the REC but is less than or equal to the TEC (Class 2), the likelihood of sediment impacting the environment is considered to be low. However, follow-up measures may be adopted to find out how the situation evolves. If levels increase, additional investigations should be carried out to identify the source of contamination and assess the impact on the environment. Here too, the reference values obtained in sediments as part of the ESIA (2016) were higher than the values you obtained in 2021 for the same parameters.

In the event that the measured concentrations also exceed natural or ambient levels, potential sources of contamination must be investigated and, if necessary, steps must be taken by those responsible to implement the necessary measures to limit the contamination. Based on the historical data from the site and the concentrations measured in 2021, where the natural levels in the sediments measured as part of the ESIA were not exceeded, we do not believe that the results demonstrate that there is a source of contamination coming from the site.

We would like to emphasize that we take any issue related to water quality and environmental protection very seriously, and considering your concerns, we propose to collaborate to implement a new series of sampling at location points that we can jointly identify, and integrate them into our monitoring program. An external firm will be hired to establish a standardized protocol for collecting, analyzing, and interpreting the results.

We are happy to collaborate in any way to ensure transparency and respect for the environment with regard to the project.

Yours sincerely,
[signature]

APPENDIX 5

Bureau Veritas laboratory analysis results

Adresse du site: SMS
Votre # Bordereau: N/A

Attention: Daniel Green

Société pour vaincre la pollution
1001 rue Lenoir
Montréal, QC
Canada H4C 2Z6

Date du rapport: 2021/12/23
 # Rapport: R2724138
Version: 1 - Finale

CERTIFICAT D'ANALYSES

 # DE DOSSIER LAB BV: C164631
Reçu: 2021/12/10, 13:20

Matrice: Sédiment
Nombre d'échantillons reçus: 10

Analyses	Quantité	Date de l' extraction	Date Analysé	Méthode de laboratoire	Méthode d'analyse
Métaux extractibles totaux	10	2021/12/11	2021/12/14	STL SOP-00069	MA.200–Mét. 1.2 R7
Phosphore total	10	N/A	2021/12/16	STL SOP-00069	MA.200–Mét. 1.2 R5 m
Soufre	10	N/A	2021/12/12	STL SOP-00028	MA. 310-CS 1.0 R3 m

Matrice: Eau de surface
Nombre d'échantillons reçus: 1

Analyses	Quantité	Date de l' extraction	Date Analysé	Méthode de laboratoire	Méthode d'analyse
Matières en suspension	1	2021/12/13	2021/12/22	STL SOP-00015	MA.104–S.S. 2.0 m

Remarques:

Bureau Veritas est certifié ISO/IEC 17025 pour certains paramètres précis des portées d'accréditation. Sauf indication contraire, les méthodes d'analyses utilisées par Bureau Veritas s'inspirent des méthodes de référence d'organismes provinciaux, fédéraux et américains, tels que le CCME, le MELCC, l'EPA et l'APHA.

Toutes les analyses présentées ont été réalisées conformément aux procédures et aux pratiques relatives à la méthodologie, à l'assurance qualité et au contrôle de la qualité généralement appliqués par les employés de Bureau Veritas (sauf s'il en a été convenu autrement par écrit entre le client et Bureau Veritas). Toutes les données de laboratoire rencontrent les contrôles statistiques et respectent tous les critères de CQ et les critères de performance des méthodes, sauf s'il en a été signalé autrement. Tous les blancs de méthode sont rapportés, toutefois, les données des échantillons correspondants ne sont pas corrigées pour la valeur du blanc, sauf indication contraire. Le cas échéant, sauf indication contraire, l'incertitude de mesure n'a pas été prise en considération lors de la déclaration de la conformité à la norme de référence.

Les responsabilités de Bureau Veritas sont restreintes au coût réel de l'analyse, sauf s'il en a été convenu autrement par écrit. Il n'existe aucune autre garantie, explicite ou implicite. Le client a fait appel à Bureau Veritas pour l'analyse de ses échantillons conformément aux méthodes de référence mentionnées dans ce rapport. L'interprétation et l'utilisation des résultats sont sous l'entière responsabilité du client et ne font pas partie des services offerts par Bureau Veritas, sauf si convenu autrement par écrit. Bureau Veritas ne peut pas garantir l'exactitude des résultats qui dépendent des renseignements fournis par le client ou son représentant.

Les résultats des échantillons solides, sauf les biotes, sont rapportés en fonction de la masse sèche, sauf indication contraire. Les analyses organiques ne sont pas corrigées en fonction de la récupération, sauf pour les méthodes de dilution isotopique.
Les résultats s'appliquent seulement aux échantillons analysés. Si l'échantillonnage n'est pas effectué par Bureau Veritas, les résultats se rapportent aux échantillons fournis pour analyse.
Le présent rapport ne doit pas être reproduit, sinon dans son intégralité, sans le consentement écrit du laboratoire.
Lorsque la méthode de référence comprend un suffixe « m », cela signifie que la méthode d'analyse du laboratoire contient des modifications validées et appliquées afin d'améliorer la performance de la méthode de référence.

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CERTIFICAT D'ANALYSES

 # DE DOSSIER LAB BV: C164631
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Notez: Les données brutes sont utilisées pour le calcul du RPD (% d'écart relatif). L'arrondissement des résultats finaux peut expliquer la variation apparente.

Note : Les paramètres inclus dans le présent certificat sont accrédités par le MELCC, à moins d'indication contraire.

clé de cryptage

Ramona Dascal
Chargée de projet
05 Jan 2022 13:07:25

Veuillez adresser toute question concernant ce certificat d'analyse à votre chargé(e) de projets
Ramona Dascal, Chargée de projet
Courriel: Ramona-Rodica.Dascal@bureauveritas.com
Téléphone (514)448-9001 Ext:7066250

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Lab BV a mis en place des procédures qui protègent contre l'utilisation non autorisée de la signature électronique et emploie les «signataires» requis, conformément à l'ISO/CEI 17025. Veuillez vous référer à la page des signatures de validation pour obtenir les détails des validations pour chaque division.

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MÉTAUX EXTRACTIBLES TOTAUX (SÉDIMENT)

ID Lab BV		JZ8367	JZ8367		JZ8368		JZ8369		JZ8370		
Date d'échantillonnage		2021/11/07 16:00	2021/11/07 16:00		2021/11/07 15:15		2021/10/24 18:32		2021/10/24 17:30		
	Unités	SD-1	SD-1 Dup. de Lab.	LDR	SD-3	LDR	SD2-CE36-4	LDR	SD2-CE36-5	LDR	Lot CQ
MÉTAUX											
Aluminium (Al) †	mg/kg	4400	4500	20	870	40	2000	20	4100	40	2256532
Antimoine (Sb) †	mg/kg	<2.0	<2.0	2.0	<4.0	4.0	<2.0	2.0	<4.0	4.0	2256532
Argent (Ag) †	mg/kg	<2.0	<2.0	2.0	<4.0	4.0	<2.0	2.0	<4.0	4.0	2256532
Arsenic (As) †	mg/kg	<2.0	<2.0	2.0	<4.0	4.0	<2.0	2.0	<4.0	4.0	2256532
Baryum (Ba) †	mg/kg	59	36 (1)	5.0	89	10	27	5.0	67	10	2256532
Béryllium (Be) †	mg/kg	<0.50	<0.50	0.50	<1.0	1.0	<0.50	0.50	<1.0	1.0	2256532
Bore (B) †	mg/kg	<5.0	<5.0	5.0	<10	10	<5.0	5.0	<10	10	2256532
Cadmium (Cd) †	mg/kg	0.31	<0.10 (1)	0.10	0.39	0.20	0.10	0.10	0.69	0.20	2256532
Calcium (Ca) †	mg/kg	2400	1700 (1)	30	9700	60	1400	30	8800	60	2256532
Chrome (Cr) †	mg/kg	12	8.6	2.0	<4.0	4.0	2.2	2.0	4.3	4.0	2256532
Cuivre (Cu) †	mg/kg	4.1	4.0	1.0	5.7	2.0	1.9	1.0	8.4	2.0	2256532
Cobalt (Co) †	mg/kg	6.2	5.4	2.0	<4.0	4.0	<2.0	2.0	<4.0	4.0	2256532
Etain (Sn) †	mg/kg	<5.0	<5.0	5.0	<10	10	<5.0	5.0	<10	10	2256532
Fer (Fe) †	mg/kg	12000	14000	10	1800	20	920	10	3800	20	2256532
Lithium (Li) †	mg/kg	<10	10	10	<20	20	<10	10	<20	20	2256532
Magnésium (Mg) †	mg/kg	2800	3200	10	1300	20	300	10	1300	20	2256532
Manganèse (Mn) †	mg/kg	250	240	2.0	55	4.0	19	2.0	110	4.0	2256532
Molybdène (Mo) †	mg/kg	<2.0	<2.0	2.0	<4.0	4.0	<2.0	2.0	<4.0	4.0	2256532
Nickel (Ni) †	mg/kg	11	9.4	1.0	2.7	2.0	1.4	1.0	7.3	2.0	2256532
Mercure (Hg) †	mg/kg	<0.050	<0.050	0.050	0.16	0.10	<0.050	0.050	0.16	0.10	2256532
Phosphore total †	mg/kg	740	490 (1)	20	550	40	93	20	770	40	2256532
Potassium (K) †	mg/kg	990 (2)	860 (2)	50	200 (2)	100	89 (2)	50	360 (2)	100	2256532
Plomb (Pb) †	mg/kg	<5.0	<5.0	5.0	22	10	<5.0	5.0	13	10	2256532
Sélénium (Se) †	mg/kg	<1.0	<1.0	1.0	<2.0	2.0	<1.0	1.0	<2.0	2.0	2256532
Sodium (Na) †	mg/kg	79 (2)	67 (2)	11	83 (2)	22	40 (2)	11	420 (2)	22	2256532
Strontium (Sr) †	mg/kg	15	<10	10	81	20	11	10	51	20	2256532
Thorium (Th) †	mg/kg	6.0	<5.0	5.0	<10	10	<5.0	5.0	<10	10	2256532
Vanadium (V) †	mg/kg	24	21	5.0	<10	10	<5.0	5.0	<10	10	2256532
Zinc (Zn) †	mg/kg	34	33	5.0	18	10	5.2	5.0	40	10	2256532

LDR = Limite de détection rapportée
Lot CQ = Lot contrôle qualité
Duplicata de laboratoire
† Accréditation non existante pour ce paramètre
(1) La récupération ou l'écart relatif (RPD) pour ce composé est en dehors des limites de contrôle, mais l'ensemble du contrôle qualité rencontre les critères d'acceptabilité pour cette analyse
(2) La limite de détection a été augmentée dû à l'instrumentation.

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Dossier Lab BV: C164631
Date du rapport: 2021/12/23

Société pour vaincre la pollution
Adresse du site: SMS

MÉTAUX EXTRACTIBLES TOTAUX (SÉDIMENT)

ID Lab BV		JZ8371	JZ8372	JZ8373	JZ8374	JZ8375	JZ8376		
Date d'échantillonnage		2021/11/07 14:44	2021/10/24 16:40	2021/11/07 13:31	2021/11/07 12:30	2021/10/23 15:30	2021/10/23 16:39		
	Unités	SD-6	SD2-CE36-7	SD-8	SD-9	SD-4-10	SD4-12	LDR	Lot CQ
MÉTAUX									
Aluminium (Al) †	mg/kg	1500	3200	2300	2700	8200	2900	20	2256532
Antimoine (Sb) †	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	2256532
Argent (Ag) †	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	2256532
Arsenic (As) †	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	2256532
Baryum (Ba) †	mg/kg	18	28	17	26	62	28	5.0	2256532
Béryllium (Be) †	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	2256532
Bore (B) †	mg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	5.0	2256532
Cadmium (Cd) †	mg/kg	0.17	<0.10	<0.10	<0.10	0.49	<0.10	0.10	2256532
Calcium (Ca) †	mg/kg	1500	1200	770	1100	2100	980	30	2256532
Chrome (Cr) †	mg/kg	<2.0	5.5	3.5	3.4	12	7.4	2.0	2256532
Cuivre (Cu) †	mg/kg	1.5	3.0	1.3	1.8	5.3	2.6	1.0	2256532
Cobalt (Co) †	mg/kg	<2.0	3.8	3.5	<2.0	11	2.3	2.0	2256532
Etain (Sn) †	mg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	5.0	2256532
Fer (Fe) †	mg/kg	1600	12000	9900	5100	24000	7000	10	2256532
Lithium (Li) †	mg/kg	<10	<10	<10	<10	12	<10	10	2256532
Magnésium (Mg) †	mg/kg	550	1300	970	1300	2300	1500	10	2256532
Manganèse (Mn) †	mg/kg	26	190	160	43	470	79	2.0	2256532
Molybdène (Mo) †	mg/kg	<2.0	<2.0	<2.0	<2.0	2.7	<2.0	2.0	2256532
Nickel (Ni) †	mg/kg	1.9	4.4	2.8	3.3	9.1	5.7	1.0	2256532
Mercure (Hg) †	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	2256532
Phosphore total †	mg/kg	190	340	310	250	810	270	20	2256532
Potassium (K) †	mg/kg	130 (1)	440 (1)	230 (1)	460 (1)	720 (1)	560 (1)	50	2256532
Plomb (Pb) †	mg/kg	<5.0	<5.0	<5.0	<5.0	6.4	<5.0	5.0	2256532
Sélénium (Se) †	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	2256532
Sodium (Na) †	mg/kg	66 (1)	71 (1)	35 (1)	55 (1)	78 (1)	58 (1)	11	2256532
Strontium (Sr) †	mg/kg	<10	<10	<10	<10	15	<10	10	2256532
Thorium (Th) †	mg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	5.0	2256532
Vanadium (V) †	mg/kg	<5.0	22	12	8.3	38	8.8	5.0	2256532
Zinc (Zn) †	mg/kg	14	21	17	16	81	16	5.0	2256532

LDR = Limite de détection rapportée
Lot CQ = Lot contrôle qualité
† Accréditation non existante pour ce paramètre
(1) La limite de détection a été augmentée dû à l'instrumentation.

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PARAMÈTRES CONVENTIONNELS (SÉDIMENT)

ID Lab BV		JZ8367	JZ8368	JZ8369	JZ8370	JZ8371	JZ8372	JZ8373		
Date d'échantillonnage		2021/11/07 16:00	2021/11/07 15:15	2021/10/24 18:32	2021/10/24 17:30	2021/11/07 14:44	2021/10/24 16:40	2021/11/07 13:31		
	Unités	SD-1	SD-3	SD2-CE36-4	SD2-CE36-5	SD-6	SD2-CE36-7	SD-8	LDR	Lot CQ
CONVENTIONNELS										
Soufre (S) †	% g/g	0.015	0.71	0.042	0.59	0.067	0.013	0.015	0.010	2256607

LDR = Limite de détection rapportée
Lot CQ = Lot contrôle qualité
† Accréditation non existante pour ce paramètre

ID Lab BV		JZ8374	JZ8375	JZ8376	JZ8376		
Date d'échantillonnage		2021/11/07 12:30	2021/10/23 15:30	2021/10/23 16:39	2021/10/23 16:39		
	Unités	SD-9	SD-4-10	SD4-12	SD4-12 Dup. de Lab.	LDR	Lot CQ
CONVENTIONNELS							
Soufre (S) †	% g/g	0.037	0.055	0.014	0.013	0.010	2256607

LDR = Limite de détection rapportée
Lot CQ = Lot contrôle qualité
Duplicata de laboratoire
† Accréditation non existante pour ce paramètre

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PARAMÈTRES CONVENTIONNELS (EAU DE SURFACE)

ID Lab BV		JZ8377		
Date d'échantillonnage		2021/11/07 17:30		
	Unités	ES-DK-1	LDR	Lot CQ
CONVENTIONNELS				
Matières en suspension (MES)	mg/L	65	2.0	2256819

LDR = Limite de détection rapportée
Lot CQ = Lot contrôle qualité

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REMARQUES GÉNÉRALES

Métaux extractibles totaux: Délai maximum de conservation pour le mercure déjà dépassé à la réception.: JZ8367, JZ8368, JZ8369, JZ8370, JZ8371, JZ8372, JZ8373, JZ8374, JZ8375, JZ8376
Matières en suspension: Délai maximum de conservation dépassé sur réception.: JZ8377
Matières en suspension: Échantillon reçu congelé.: JZ8377

MÉTAUX EXTRACTIBLES TOTAUX (SÉDIMENT)

Les limites de détection indiquées sont modifiées en fonction du volume d'échantillon reçu.

Noter que l'échantillon JZ8367-01 est non homogène.

Les résultats ne se rapportent qu'aux échantillons soumis pour analyse

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RAPPORT ASSURANCE QUALITÉ

Lot AQ/CQ	Init	Type CQ	Groupe	Date Analysé	Valeur	Réc	Unités
2256532	AT7	Blanc fortifié	Aluminium (Al)	2021/12/14		97	%
			Antimoine (Sb)	2021/12/14		102	%
			Argent (Ag)	2021/12/14		82	%
			Arsenic (As)	2021/12/14		98	%
			Baryum (Ba)	2021/12/14		101	%
			Béryllium (Be)	2021/12/14		94	%
			Bore (B)	2021/12/14		102	%
			Cadmium (Cd)	2021/12/14		98	%
			Calcium (Ca)	2021/12/14		97	%
			Chrome (Cr)	2021/12/14		101	%
			Cuivre (Cu)	2021/12/14		99	%
			Cobalt (Co)	2021/12/14		99	%
			Etain (Sn)	2021/12/14		107	%
			Fer (Fe)	2021/12/14		100	%
			Lithium (Li)	2021/12/14		97	%
			Magnésium (Mg)	2021/12/14		99	%
			Manganèse (Mn)	2021/12/14		97	%
			Molybdène (Mo)	2021/12/14		98	%
			Nickel (Ni)	2021/12/14		101	%
			Mercure (Hg)	2021/12/14		109	%
			Phosphore total	2021/12/14		96	%
			Potassium (K)	2021/12/14		100	%
			Plomb (Pb)	2021/12/14		102	%
			Sélénium (Se)	2021/12/14		93	%
			Sodium (Na)	2021/12/14		103 (1)	%
			Strontium (Sr)	2021/12/14		101	%
			Thorium (Th)	2021/12/14		106	%
			Vanadium (V)	2021/12/14		97	%
			Zinc (Zn)	2021/12/14		98	%
2256532	AT7	Blanc de méthode	Aluminium (Al)	2021/12/14	<20		mg/kg
			Antimoine (Sb)	2021/12/14	<2.0		mg/kg
			Argent (Ag)	2021/12/14	<2.0		mg/kg
			Arsenic (As)	2021/12/14	<2.0		mg/kg
			Baryum (Ba)	2021/12/14	<5.0		mg/kg
			Béryllium (Be)	2021/12/14	<0.50		mg/kg
			Bore (B)	2021/12/14	<5.0		mg/kg
			Cadmium (Cd)	2021/12/14	<0.10		mg/kg
			Calcium (Ca)	2021/12/14	<30		mg/kg
			Chrome (Cr)	2021/12/14	<2.0		mg/kg
			Cuivre (Cu)	2021/12/14	<1.0		mg/kg
			Cobalt (Co)	2021/12/14	<2.0		mg/kg
			Etain (Sn)	2021/12/14	<5.0		mg/kg
			Fer (Fe)	2021/12/14	<10		mg/kg
			Lithium (Li)	2021/12/14	<10		mg/kg
			Magnésium (Mg)	2021/12/14	<10		mg/kg
			Manganèse (Mn)	2021/12/14	<2.0		mg/kg
			Molybdène (Mo)	2021/12/14	<2.0		mg/kg
			Nickel (Ni)	2021/12/14	<1.0		mg/kg
			Mercure (Hg)	2021/12/14	<0.050		mg/kg
			Phosphore total	2021/12/14	<20		mg/kg
			Potassium (K)	2021/12/14	<50		mg/kg
			Plomb (Pb)	2021/12/14	<5.0		mg/kg
			Sélénium (Se)	2021/12/14	<1.0		mg/kg

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RAPPORT ASSURANCE QUALITÉ (SUITE)

Lot AQ/CQ	Init	Type CQ	Groupe	Date Analysé	Valeur	Réc	Unités
			Sodium (Na)	2021/12/14	<11		mg/kg
			Strontium (Sr)	2021/12/14	<10		mg/kg
			Thorium (Th)	2021/12/14	<5.0		mg/kg
			Vanadium (V)	2021/12/14	<5.0		mg/kg
			Zinc (Zn)	2021/12/14	<5.0		mg/kg
2256607	BAG	MRC	Soufre (S)	2021/12/12		94	%
2256607	BAG	Blanc de méthode	Soufre (S)	2021/12/12	<0.010		% g/g
2256819	SKL	Blanc fortifié	Matières en suspension (MES)	2021/12/22		98	%
2256819	SKL	Blanc de méthode	Matières en suspension (MES)	2021/12/22	<2.0		mg/L

MRC: Un échantillon de concentration connue préparé dans des conditions rigoureuses par un organisme externe. Utilisé pour vérifier la justesse de la méthode.

Blanc fortifié: Un blanc, d'une matrice exempte de contaminants, auquel a été ajouté une quantité connue d'analyte provenant généralement d'une deuxième source. Utilisé pour évaluer la précision de la méthode.

Blanc de méthode: Une partie aliquote de matrice pure soumise au même processus analytique que les échantillons, du prétraitement au dosage. Sert à évaluer toutes contaminations du laboratoire.

Réc = Récupération

(1) The detection limit was raised due to instrumentation.

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Les résultats analytiques ainsi que les données de contrôle-qualité contenus dans ce rapport ont été vérifiés et validés par:

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APPENDIX 6

Location of samples collected during the citizen sampling campaign

Ech_ID	Cours d'eau	Date_ech	Heure	X	Y
SD-1	CE25	2021-11-07	16:00	-73.98690	46.62960
SD-3	CE36	2021-11-07	15:15	-73.98260	46.62730
SD2-CE36-4	CE36	2021-10-24	18:32	-73.98020	46.62360
SD2-CE36-5	CE36	2021-10-24	17:30	-73.97690	46.61960
SD-6	CE36	2021-11-07	14:44	-73.97520	46.61820
SD2-CE36-7	CE36	2021-10-24	16:40	-73.97140	46.61340
SD-8	CE36	2021-11-07	13:31	-73.97040	46.61030
SD-9	Ruis à l'eau Morte	2021-11-07	12:30	-73.96940	46.60860
SD-4-10	CE05	2021-10-23	15:30	-73.97100	46.63940
SD4-12	CE23	2021-10-23	16:39	-73.97070	46.63710

Geographic Coordinate System	NAD 1983 (CSRS)
Angular Unit	Degree (0.0174532925199433)
Prime Meridian	Greenwich (0.0)
Datum	D North American 1983 CSRS
Spheroid	GRS 1980