



Club des naturalistes du
Restigouche
Naturalists Club
restnatclub@gmail.com

January 13, 2025

To : Premier Susan Holt
Minister Gilles LePage
MLA Guy Arseneault
Town Council, Heron Bay

We, the pozzolan Study Committee of the Club des naturalistes du Restigouche Naturalists' Club, wish to make it known that we oppose the EcoRock Dalhousie pozzolan open-pit mining project that is being proposed for the area known as Dalhousie Mountain in the County of Restigouche in northern New Brunswick. Our opposition is based on two major considerations: this project poses serious threats to the health and well-being of the citizens of Dalhousie/ Heron Bay, and dredging activities that are planned for the Port of Dalhousie will threaten the already highly stressed Atlantic salmon population of the Restigouche River and its tributaries.

It is already known in scientific circles that the pozzolan that is to be extracted from the extended open-pit mine that is being proposed will release large quantities of an extremely fine, highly concentrated carcinogenic dust into the surrounding area, thus posing health threats to residents, to the students and staffs of two nearby high schools, and to the residents and staffs of nearby senior citizens facilities.

Should the extracted pozzolan be shipped from the Port of Dalhousie, port facilities will have to be dredged to deepen the water to allow for large ships to load the product for export. Those facilities are affected by the strong currents and tides that flow by them now. These currents will be carrying large volumes of the disturbed silt that is already highly contaminated by previous industrial activities in the area, not only out to sea, but further upstream by rising tides. Endangered Atlantic salmon stocks from the Upsalquitch, the Matapedia, the Kedgwick, as well as the Restigouche River migrate through these waters annually.

Focussing on the health and wellbeing of the citizens of Heron Bay and of the waters of the surrounding area in no way diminishes the important concerns of other citizens of Heron Bay, the broader area of Restigouche County, the two First Nations of Ugpi'Ganjig and Listuguj, or of neighbouring communities in Gaspé.

Pozzolan Study Committee
Club des naturalistes du Restigouche Naturalists Club



Club des naturalistes du
Restigouche
Naturalists Club
restnatclub@gmail.com

April 6, 2025

Premier Susan Holt
Gilles Lepage, Minister of the Environment
Louise Imbeault, Lieutenant Governor
Guy Arsenault, MPP
Mayor and Heron Bay Council
Betty Ann Fortin, CEO Restigouche District Planning Commission

Heron Bay Pozzolan Mine: Silica Dust

The Pozzolan Study Committee of the Club des naturalistes du Restigouche Naturalists Club has serious concerns about the proposed pozzolan mine in Heron Bay, in the town of Dalhousie.

In our earlier correspondence to you we noted the threats posed to the health of the residents from the mining of the pozzolan rock, especially exposure to the silica in the dust. As naturalists we concern ourselves with the quality of air and water for all the ecosystems in our area and are alarmed that silica dust, a known carcinogen, would be introduced to the area. This mine's location is within the town boundaries, exposing all residents to the adverse health effects of the mine. In addition, we are concerned about the high levels of arsenic that will be released during the mining activity and the very real threat of exposure to heavy minerals to the endangered Atlantic salmon population by dredging the port channel in the Restigouche River.

The recently announced \$2 million investment from ACOA confirms the serious intent for moving this mining project forward. EcoRock is coaching the development of this mineral as a "green" initiative but to place an open pit mine within the town, next to residential and educational establishments poses a danger to our health.

While we have reservations regarding the economic benefits touted in this proposal, of even greater concern are the risks that exposure to silica dust present to the health of students in both our French and English high schools just 200 meters from this development. Extreme caution should be exercised regarding the health of our youth at such a vulnerable time of their physical development. Would you risk exposing your children and your neighborhood to cancer caused by invisible silica dust?

To understand the health risks posed by silica dust to the students and all local residents we attach a paper with references to published research confirming the risk of silica dust. The risk of exposure to this cancer-causing dust is very alarming and proper consideration for the health of the residents in the area requires careful review. Our geographic area has already borne its share of industrial pollution. We fear that

the operation of the pozzolan mine will introduce additional serious health issues to our friends and families.

Please read the following paper and consider our voting citizens as you weigh the pros and cons of this industrial development inside our town. We live here and repercussions due to mistakes made now will be borne by our citizens in the short and long term.

Sincerely,

Pozzolan Study Committee
Restigouche Naturalists Club

Pozzolan as A Carcinogen

Cancer in New Brunswick 2014-2018, a report prepared by the New Brunswick Department of Health, provides a view of the current state of cancer in the province. Among other considerations, it provides statistics on the incidence of cancers in the various Health Regions of the province.

Among those statistics that are most relevant to this paper are the data pertaining to Health Region 5, Restigouche County, which includes Dalhousie (now Heron Bay). Health Region 5 has the highest incidence among both women and men of lung cancer in the entire province. Further, it is the only jurisdiction in the province in which lung cancer (again in both sexes) is the prevalent form of cancer.

At the time that this report was published (five or six years ago) the national average incidence of lung cancer among all forms of cancer for men was 13.2%, and for women, 13.5%. In Health Region 5, it was 21.8% for men, and 22.7% for women.

“In all of New Brunswick, lung cancer was responsible for the highest percentage of deaths in both sexes across all health regions.” Further, the average death rate for males from lung cancer in the province was 29.6%, and for females, 26.3%. In Health Region 5, lung cancer was responsible for 35.2% of cancer related deaths in males; in females, it was 29.0%.

This report does not attribute any specific causes to this anomaly in lung cancer in Health Region 5 but Dalhousie has long been an industrial area. Although the mills, chemical plants, and other such industries have vanished within the past few years, their impact on the soil and water remains in the designated “brownfields” of the region. These are areas that have been contaminated and are still considered usable only for potential industrial purposes.

Enter Pozzolan:

Pozzolan is “a siliceous or siliceous and aluminous material that in itself possesses little or no cementitious value but will, in finely divided form and in the presence of moisture, chemically react with calcium hydroxide at ordinary temperatures to form compounds having cementitious properties. It “typically contains a significant amount of silicon dioxide (SiO₂), with most standards requiring a minimum of around 70% combined SiO₂, Al₂O₃ and Fe₂O₃, where the majority of that percentage should come from reactive silica (SiO₂) to be considered a suitable pozzolan.” [Wikipedia]

Silica appears in nature in two forms - one is a rather loose assemblage of atoms that is labeled “amorphous” silica; the other is crystalline silica, much more tightly organized, chemically inert, with a high melting point. Both forms appear in pozzolan, but crystalline silica is the greater concern in this paper (although amorphous silica will be noted below).

Pozzolan was mixed with other ingredients by the Romans some two thousand years ago because they realized that its addition to a cement mixture added greatly to the strength of that mixture. At some point, it was realized that the pozzolan had to be ground into an ultrafine dust in order for it to work effectively, and even more recently that the process might have negative side-effects in terms of possible human health. "The key issue is that micro-particulate crystalline silica (the primary ingredient in cement) can inflict permanent lung fibrosis ... producing chronic respiratory problems and possibly amplifying the risk of various cancers." [pers.com.]

To visualize just how small an ultrafine particle is, 300 000 of them may be contained in a single one cubic centimeter container. Another comparison - an ultrafine particle is 1000 times thinner than a single strand of human hair. Thus they can be breathed into the lungs and passed into the blood stream to other internal organs - including the brain.

A recent CBC News story [September 27, 2024] states that ultrafine particles "have the potential to cause major health problems." The news item cites a recent Health Canada report that estimates that exposure to air pollution contributes to some 17,400 deaths annually in Canada, of which 12,500 are attributed to particulate matter smaller than PM2.5 [ultrafine particles]. That is, nearly 72% of these deaths are caused, at least in part, by ultrafine particles.

Early research (i.e. c. 2005) concluded that inhalation of crystalline (CS) and amorphous (AS) silica results in human pulmonary inflammation. However, researchers at that time determined that silicosis only develops following CS exposure (1)

However, recent research indicates otherwise. An article that was published in 2019 in the *Polish Journal of Environmental Studies* discusses the rapidly increasing uses of pozzolan in industrial construction and general road repair because of its efficacy. However, the article goes on to state: It seems that all this causes silica, in a much larger quantity than is generally estimated, to be introduced into the environment, especially to the atmosphere and the ground environment. The problem of excessive inhalation of silica may be important due to health exposure, not only in groups of people professionally exposed to its inhalation such as construction industry workers and miners, but also commonly in humans and everywhere where there is a lot of silica in the atmosphere. (2)

"Long-term respiratory exposure to amorphous silica nanoparticles promoted systemic inflammation and progression of fibrosis in susceptible mouse model collectively our study firstly demonstrated that long-term exposure to SiNPS [Silicon nanoparticles] promoted mast-cell dominated activation of inflammatory responses not only in the lungs but also in the heart, liver and kidney, etc. eventually leading to the progression of tissue fibrosis... . " (3)

In conclusion, “cutting edge science is still trying to figure out the risk/reward ratio for pozzolan, when you have papers from 2021 and 2022 ... using a lot of “might be” and “may cause” phrasing, it means that substantial precautions are advised regarding any operation that’s going to generate a lot of dust”. [pers. com]

Many of the people of the old Town of Dalhousie and the nearby communities of Point La Nim and Ug’pi Ganjiq remember the last years of nearly a century of industrial pollution that contributed to the devastating cancer rates of the area that continue to manifest themselves. Surely there is no moral justification for introducing a new source of this contamination.

Sincerely,

Pozzolan Study Committee
Club des naturalists du Restigouche Naturalists Club

References

1. AM J Physiology: Lung Cancer and Molecular Physiology, June 2005
2. Pentaka, et al. “Silica Dust as an Additive in Concrete with Proven Impact on Human Health” Polish Journal of Environmental Studies. 2019.
3. Chemosphere, Volume 300, August, 2023

“Ultrafine particles: Tiny and unregulated, UFPS [Ultrafine Particles] have the potential to cause major health problems.” Andre Mayer. CBC News. September 27, 2024

“Cancer in New Brunswick, 2014-2018” a study prepared by the New Brunswick Department of Health

Wikipedia: several entries dealing with various aspects of Pozzolan composition, usage, and health risks.

CX-030-S Steering Committee - Mandate and Operation 3024-22-02
ECOROCK Dalhousie

“Pozzolan Activity”. Science Direct: Chapters and Articles, 2019 ff.

“Pozzolan activity and Environmental risk assessment of water-based drilling cuttings of shale gas” Science Direct: Construction and Building Materials, volume 348, 19 September 2022

**NOTE: pers.com Personal Communications were with Dr. Gerald Lushington, PhD
Qnapsyn Biosciences, inc.
Neurological and Immunological Therapeutic and Diagnostic Development**



Club des naturalistes du
Restigouche
Naturalists Club
restnatclub@gmail.com

June 1, 2025

Premier Susan Holt
Gilles Lepage, Minister of the Environment
Louise Imbeault, Lieutenant Governor
Claire Johnson, Minister of Education and Early Childhood Development
Guy Arsenault, MPP
Mayor and Heron Bay Council
Betty Ann Fortin, CEO Restigouche District Planning Commission
Francis Forlini, Ecorock Dalhousie

Heron Bay Pozzolan Mine: Arsenic Contamination

In a Geological Survey of Canada Current Research 2009-7 paper, entitled *Geoscience modelling of relative variation in natural arsenic hazard potential in New Brunswick*, the authors (1) state (in the Abstract to their article) that *“In eastern Canada, natural arsenic concentrations in bedrock, soil, and water exceed levels associated with acceptable human health risk, and they are linked with enhanced risk for disease. In their Introduction, they observe that:*

“Arsenic is a naturally occurring, nonessential trace element known as a causative agent for a wide range of diseases ... and it is identified as a toxic substance in the Canadian Environmental Protection Agency’s Priority I Substances List Originating in minerals of the Earth’s crust, its potential for harm is further increased through natural weathering and soil-formation processes that promote its wider dispersal in the biosphere.”

The authors refer to studies that map the presence of arsenic in “soil parent material” and conclude that *“the greatest arsenic concentrations ... preferentially occur along the southeastern limb of a belt of metamorphic shale and metavolcanic bedrock associated with hazard zones 3 and 4 [that would include Dalhousie Mountain]. ... [the scale bedrock maps indicate that] the greatest arsenic values are preferentially associated with Ordovician rhyolite and early Devonian and Silurian marine metasedimentary rock.” (1)*

It is worth noting that the mountain that we call Sugarloaf today erupted some 400 000 000 years ago in the early Devonian geological period and deposited the metavolcanic bedrock that contains the pozzolan that is the subject of our present concern.

“Arsenic is a poisonous element and its super mobility can pose a major threat to the environment and human beings. Disposed arsenic-bearing waste or minerals over time may release arsenic onto the groundwater, soil and then the food chain.” (2)

The University of Maine has recently published a series of ten interrelated essays under the generic title Arsenic. (3) The essays begin with a definition of the element as it appears in its various forms, continue with a synopsis of how it has been used, and abused, throughout its long interaction with humans, and then discusses how it becomes a major health issue to those who come into contact with it. What applies to Maine applies to New Brunswick because of our shared geographical and geological heritage.

“Central Maine all the way up through northern NB all likely derives much of its arsenic from the ‘Tobique Group’, which is a Silurian / Devonian geological feature with substantial volcanic and megmatic composition. ... Along the Chaleur, I suspect that it’s primarily a bedrock [as opposed to a surface soil] feature. (4)

In the remainder of this paper, I have concentrated on the essay How Does Arsenic Get into the Groundwater? This is one of the ten articles to which I have alluded above.

- Arsenic exists in nature in various water soluble and insoluble forms;
- Only soluble forms can end up in water;
- If the arsenic is not soluble, it will precipitate and remain in the solid phase of the groundwater system as part of the soil;
- So long as the groundwater soil is undisturbed, the arsenic will remain inert;
- However, when the soil is disturbed, it is exposed to oxygen;
- Oxygen works on the disturbed soil and increases the soil’s pH;
- As the pH rises, arsenic is activated and escapes from the soil to enter the environment.

Because most of the arsenic of concern in the Dalhousie Mountain pozzolan mine project is located in metavolcanic bedrock, it is imperative that any arsenic sampling is extracted by boreholes that penetrate that bedrock at least as deeply as will be the planned extraction, quarrying activity. And there needs to be transparency on the part of the extractors on the results of that boring.

It has been discovered that pozzolan is an effective “binding surface” for arsenic (as well as other noxious chemicals) - that is, so long as it is not disturbed. Once it is disturbed though, it releases ultrafine particles of silica into the air and arsenic into the waterways, where it will be redistributed into lakes, streams, coastlines, or into adjacent land forms, where it will remain in its toxic state until, or unless it is sequestered once again in an anaerobic state. Obviously that does not always happen. To anyone who is at all familiar with the properties of ultrafine particles of dust, regardless of their origin, it has been demonstrated, time and again, that it is impossible to control their containment completely. Mining the local pozzolan and crushing it to the extremely fine dust needed for an effective cement additive will create this dust at several junctures in its production.

This, we hold, is fundamentally irresponsible.

Sincerely,

Pozzolan Study Committee

Club des naturalistes du Restigouche Naturalists Club

References

1. *Klassen et al*
2. Manandra et al. Comparative Study for Flue Dust Stabilization in Cement and Glass Materials: A Stability Assessment of Arsenic. Research Gate3.
3. Website created in part as a project supported by the National Science Foundation.
4. pers. comm with Dr. Gerald Lushington, PhD, Qnapsyn Biosciences