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On the trail of a 'deadly' mineral

Bernie Napp - Thu, 24 Sep 2020



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City Rail Link has not found a fibrous zeolite in Miocene sandstone under Auckland, while the University of Auckland is hot on the trail of the mineral type - which has been linked to some deaths in three Turkish villages in the 1970s.

“Erionite is deadly, 600 times more carcinogenic than asbestos fibres,” says geology associate professor Martin Brook.

Some \$7.6 million of publicly funded research is being finalised to find the mineral in Auckland, assess its levels of concentration, and develop mitigation strategies.

“I came across erionite by chance,” Brook says of what sparked his interest. “I did not know what it was; I had to do a bit of a literature review, and all [this stuff in Turkey](#) [2] came up.”

Karain, Tuzkoy and Old Sarihidir in Cappadocia were built of a Miocene sandstone deposited in similar geological conditions and time period to the Waitemata Group sandstones in Auckland.



[Erionite-afflicted village in Turkey](#)

[3]

Genesis of a research project

As far back as the early 1980s a former geologist at the University of Auckland, Jack Grant-Mackie, sent a sample of erionite-bearing rock from Kaipara to London in the UK for testing on rats.

More recently, Brook decided to look at the local rock exposures for himself and noted significant construction in the Auckland area over the last decade, including “a fair bit of tunnelling going on”.

He and others wrote a paper on erionite published in the [NZ Medical Journal](#) [4], while hoping sandstones were being tested for zeolite presence to inform risk management for construction.

For example, waste rock to be dumped as cleanfill would have to be reclassified as contaminated fill if erionite were present.

Erionite fibres are dangerous to human health when airborne, causing a similar lung cancer, mesothelioma, to that occasioned by blue asbestos in building and other products.

Late last year, Brook pulled together a research team including geologists, airborne pollution experts, a Vision Mātauranga expert and [geologist Dan Hikuroa](#) [5] of the University of Auckland.

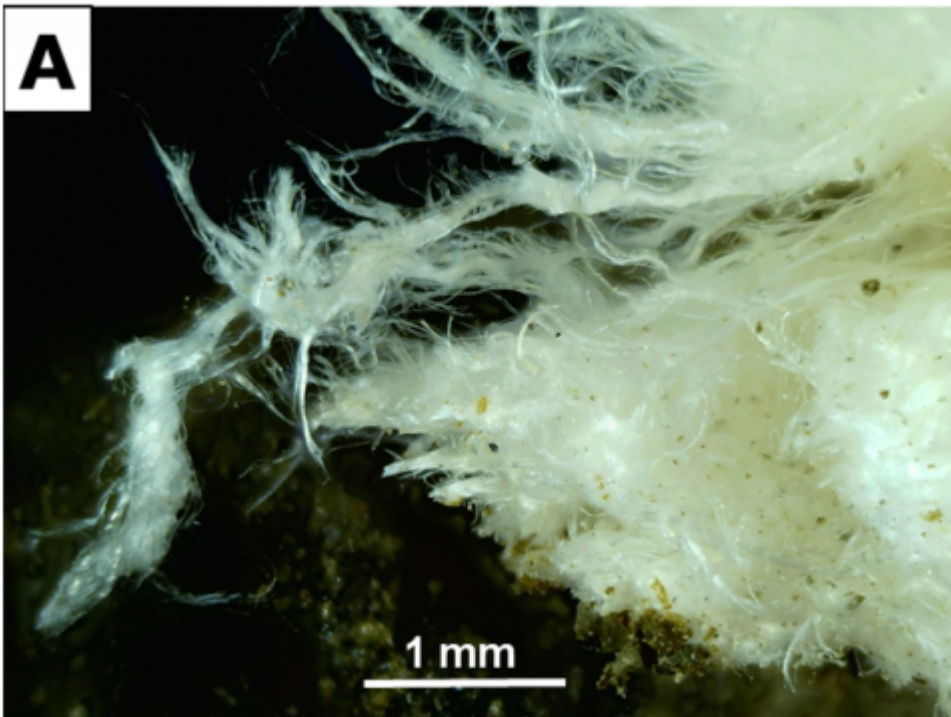
Research aims

A successful Endeavour Fund bid to the Ministry of Business, Innovation and Employment will kick off a four-year research project, starting from next month.

The bulk of the time will be spent in exploration geology of erionite, drawing on existing sandstone drill core, and testing with XRD and scanning and transmission electron microscopy, Brook says.

Two PhD students and a postdoctoral fellow will lead this work, and samples will be sent to the international experts in zeolite science, the University of Modena in northern Italy.

Then follows testing for airborne transport of erionite in areas where the mineral is identified close to the ground surface, and development of policy for erionite risk management.



Erionite in New Zealand rocks

City Rail Link comment

From the project’s inception, the University of Auckland has consulted with the construction sector. A workshop in November last year included representatives from Beca, Auckland Council, MinEx, and City Rail Link.

CRL’s general manager health, safety, environment & sustainability, Rob Mair, says: “After a review, City Rail Link and others did challenge some of the language used in the Erionite Research Group’s draft briefing paper.”

“It was felt that the language used could create an impression that the safety and health impacts on construction work were not being managed adequately for workers or the public. This perception is incorrect and the Group’s published paper addressed our comments,” Mair says.

CRL considers the risk of erionite being present within its 3.45-kilometre-long corridor to be very low.

“To date, no erionite has been identified at CRL sites nor from the project’s geotechnical investigations,” Mair says, which included hundreds of test bore holes along the corridor.

Tunnelling will produce a “porridge-like sludge”, therefore not conducive to dust, he says.

Other site controls include damping down dust, maintaining exclusion zones, dust monitoring and inspections, use of appropriate PPE, and covering and damping down of spoil from works.

“The scale of CRL gives the project a great opportunity to provide more data about erionite and to share that information with research groups and the wider construction industry.” Mair says.

Brook says of CRL: “They have certainly taken an interest, which is great.”

He sees erionite as an issue arising during surface earthworks that create dust, rather than in connection with tunnelling.

“I think the real issue is residential sites for subdivision if there is a zeolite or a sandstone close to the surface.

“I know in the tunnelling industry, in the construction industry, has changed. They are very risk averse, and very professional, and they take health and safety very seriously,” Brook says.

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- [2] <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5497117/>
- [3] <https://www.insideresources.co.nz/sites/default/files/images/2020/09/24/erionite2.jpg>
- [4] <https://www.nzma.org.nz/journal-articles/erionite-in-auckland-bedrock-and-malignant-mesothelioma-an-emerging-public-and-occupational-health-hazard>
- [5] <https://www.insideresources.co.nz/news-story/minerals/38486/more-vesting-crown-minerals-iwi-possible-academic>
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