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Graymont submission on draft Critical Minerals List for New Zealand

Thank you for the opportunity to make a submission on the draft Critical Minerals List.

This submission outlines the need for including quicklime[1] in the List and explains the rationale for that decision.

Quicklime is critical to New Zealand's major industries, civil infrastructure and to meeting the Government's minerals strategy objectives. Quicklime demand is currently met by domestic production, but due to the nature of production processes, this local supply is susceptible to several supply chain risks.

Excluding quicklime from the List could result in various risks to New Zealand's ambitions and social and economic resilience. These include:

- Difficulty in implementing the Minerals Strategy
- Public health risks due to potentially disrupted drinking water and wastewater treatment
- Higher risk of disruption to food production, including key agricultural industry
- Risk to the ongoing supply of vital inputs to the economy, including steel, paper, and fertiliser
- Lost opportunities for future low-carbon cementitious products

Quicklime is an essential product in New Zealand

The first criterion for including a mineral in the Critical Minerals List is that it is "*essential to New Zealand's economy, national security, and technology needs, including renewable energy technologies and components to support our transition to a low emissions future*."

Quicklime meets this criterion as it's used in the following ways to support New Zealand's economic, sovereign capability, and technological needs:

- Mining: Quicklime is used both to extract minerals from their ores, including many that contribute significantly to the national economy, and to purify water discharged from the process. It is, therefore, essential for supporting the "responsible mineral production" outlined in the proposed New Zealand Minerals Strategy.
- Steel making: Quicklime is an essential component of steel making, including at the Glenbrook steel mill. New Zealand Steel have clearly identified quicklime as essential to its process.
- Food and Water industry: Water utilities use quicklime products to deliver their lifeline services, including treating drinking water and sewage sludge, which is essential for

[1] Quicklime has several synonyms, but the term used internationally is quicklime. It is also referred to as lime (not to be confused with agricultural lime which is a ground limestone product) and burnt lime (as described in the New Zealand Emission Trading Scheme). The active ingredient in quicklime is calcium oxide (CaO), which is sometimes used in literature.

protecting our environment and the health of humans and animals. Amongst others, Watercare and Water NZ have indicated that:

"*Quicklime is critical to [our] water and wastewater operations.*"

Quicklime products are also used to refine sugar and mitigate waste from other food manufacturing processes (see below).

- Environmental solutions: Various dairy and meat processing plants use quicklime to treat pollutants in their water and waste, as do some mining operations. Historic pollution can be treated using quicklime, and the operator of the joint Crown/Treasury/iwi project to mitigate legacy acid mine drainage at Stockton has stated:

  "*It is essential for the…ecological health of the Ngakawau River and estuary that we have security of supply of quicklime from a New Zealand source.*"

  Quicklime is also used to manufacture a less-leachable fertiliser, with corresponding water quality benefits.

- Infrastructure: Quicklime is mixed into wet soils in many earthworks projects, turning weak soils into a competent sub-base. In addition, products can improve the strength of pavements, increasing the reliability and longevity of roads. Quicklime products are used in numerous New Zealand projects, such as the Central Interceptor in Auckland and various roading and subdivision projects.

- Low-carbon future: In addition to aiding the refinement of materials essential for the green economy, products such as Graybond™ (a quicklime/pozzolan product being considered for the New Zealand market) can significantly reduce greenhouse gas (GHG) emissions in applications such as mine backfill and tailings, with future expansions into soil stabilization and road construction.

As described above, the benefit of quicklime to the broader New Zealand economy is significant. However, quicklime manufacturing activities also benefit the regional economy, particularly the Waitomo area. A 2018 study showed that Graymont supported skilled jobs that paid well, contributing 6.9% of total wage earnings despite only employing 46 employees. This is broadly consistent with a more recent study in Victoria, Australia that used Australian Bureau of Statistics multipliers and showed that for every 10 employees directly employed in the quicklime industry, an additional 56 jobs were created elsewhere in the economy.

The examples above clearly show that quicklime and derived products are critical to the economy, national security (through support to industries that provide essential social and economic services), and the transition to a low-carbon economy. The domestic quicklime supply is highly valued by its customers, and Graymont can supply letters of support if requested.

Supply chain risk

Quicklime production is subject to significant supply chain risk due to two key factors: carbon leakage risk; and environmental permitting timeframes. These factors clearly align with the final criticality test: "*susceptible to supply disruptions domestically and internationally.*"

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Carbon leakage risk

Because of the high proportion of carbon inherent in quicklime manufacturing (see details in **About Graymont**), quicklime is particularly sensitive to carbon pricing. If this carbon price is unevenly applied compared to international producers, there is a high risk of carbon leakage. Internationally, the risk of carbon leakage is mitigated by either excluding quicklime from paying a price on carbon or offering industrial allocation.

In New Zealand, the Emissions Trading Scheme provides industrial allocation for Emissions Intensive, Trade Exposed industries, and quicklime manufacturing is recognised as highly exposed. This support is essential for maintaining a domestic quicklime industry. Still, it is susceptible to local policy changes that result in international competitors having an advantage due to lower or no carbon pricing. Currently, the industrial allocation support for quicklime manufacturing is reducing by 1% per year, along with a proposed 8% drop to take effect in 2024.

Quicklime manufacturing, therefore, has a significant supply chain risk due to the possibility of carbon leakage.

Environmental permitting

The environmental permitting regime is also a risk to an ongoing domestic supply of quicklime. Due to the significant timeframes and uncertain outcomes, there is a high degree of risk in embarking on a permitting process in New Zealand. Graymont has been working to obtain the necessary authorisations to develop a new limestone quarry (the key input for quicklime manufacturing), and the process has taken five years so far, with further decisions about the resource consent process still to come.

This is a significant investment and timeframe for resource development, and authorisations have yet to be granted. Additionally, quicklime manufacturing requires separate authorisations to operate the kiln sites as are necessary for limestone calcination.

These factors translate to supply chain uncertainty for domestically manufactured quicklime.

International supply chain uncertainty

International supply chain risk was tested during the COVID-19 pandemic, and the value of domestic manufacturing for supply into lifeline sectors was keenly felt due to the need for a continuous supply available on demand. **This is why quicklime was classified as an essential service in every jurisdiction in which Graymont operates.**

Conclusion and recommendation

Essential to a wide range of industrial, construction, and agricultural markets and applications, quicklime solutions and products support air and water purification, critical minerals, and production of materials such as paper, steel, and assorted other metals.

Quicklime products will be essential to supporting many of the Government's priorities, including the proposed Minerals Strategy, improving infrastructure and improving the country's resilience. Inclusion on this list will also help attract further investment as it sends a clear signal that the Government recognises the strategic importance of quicklime to New Zealand.

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Quicklime is currently manufactured domestically but is susceptible to supply chain risks due to the challenges of an uneven application of carbon pricing across borders, uncertainty, and long timeframes in environmental permitting. As seen during the COVID-19 pandemic, international supply chains cannot be relied on for quicklime products, which need to be available on demand to support lifeline industries.

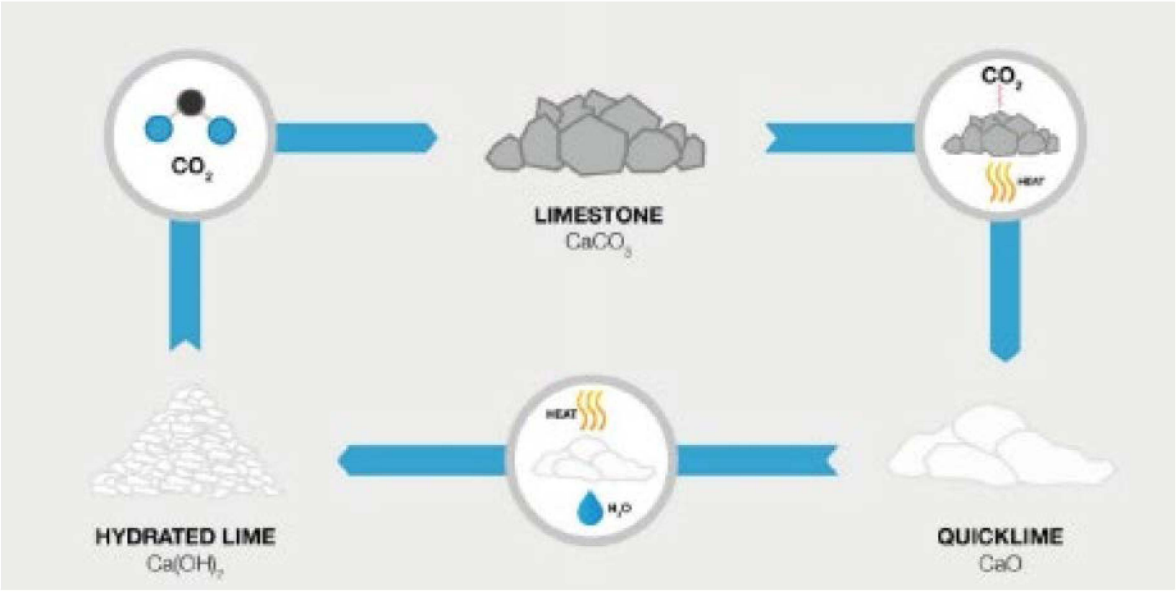
Key recommendation: Classify quicklime as a Critical Mineral. This will help to ensure that policymakers consider the implications for continued domestic production when making decisions.

About Graymont

Graymont is a global leader in quicklime and limestone solutions, an essential product to address today's most pressing environmental issues while supporting vital industrial processes and agricultural needs.

The production of quicklime is inherently energy- and emissions-intensive. It is produced by calcination — heating limestone to high temperatures (900+ degrees) — which releases CO_2 and produces quicklime. The calcination reaction is represented below and is an inalienable fact of quicklime production.

Approximately two-thirds of the emissions arise from the reaction of calcium carbonate ("process emissions"), and the remainder arise from the fuel used ("combustion emissions").



Quicklime and relationship to limestone

We propose that quicklime is classified as critical rather than all limestone deposits. This is because only select limestones are suitable for calcination, and only some meet quality standards essential to meet the demands of those customers described in **Quicklime is an essential product in New Zealand**.