



Testimony on proposed changes to Chapter 200: Metallic Mineral Exploration, Advanced Exploration and Mining

Testimony by Nick Bennett, Staff Scientist

January 18, 2024

Good morning, Chair Lessard and members of the Board of Environmental Protection. My name is Nick Bennett, and I am the staff scientist for the Natural Resources Council of Maine (NRCM). NRCM is Maine's largest environmental advocacy group with more than 30,000 members and supporters. I am testifying in support of the Department of Environmental Protection's (DEP) proposed changes to Chapter 200: Metallic Mineral Exploration, Advanced Exploration and Mining.

I participated in the work sessions in front of the Environment and Natural Resources Committee that resulted in the amended version of LD 1363, An Act to Support Extraction of Common Minerals by Amending the Maine Metallic Mineral Mining Act. This bill eventually passed the full Legislature with strong bipartisan support and resulted in the requirement for DEP to develop major substantive rules, the Chapter 200 amendments that you have in front of you today.

NRCM has been involved extensively in mining issues in Maine going back to the early 1990s. We worked closely with members of the Legislature, DEP, and other environmental groups to pass the 2017 Maine Metallic Mineral Mining Act and the existing Chapter 200 rules. To say the existing law and rules took a lot of work to develop would be a major understatement. Therefore, NRCM does not take any amendments to the law or rules lightly.

As DEP noted in its memo to the Board, the 2017 law and existing Chapter 200 rules were primarily meant to protect Maine's environment from the risks of mining in sulfide deposits. Today's proposed amendments would not apply to sulfide deposits.

Maine essentially has two types of laws and regulations governing mining: those that govern minerals that are reactive and those that govern minerals that are non-reactive. Sulfide minerals generate acid when exposed to air and water. Not only ore but also waste rock (rock from the areas surrounding the orebody or ore that is too low in value to process) from sulfide deposits generates acid when exposed to air and water. One of the best ways to minimize the risk of acid mine drainage is not to allow open-pit mining of sulfide deposits because it produces so much more acid-generating waste rock than underground mining. Underground sulfide mines can still produce acid mine drainage and severely damage the environment, but they are a better alternative for mining sulfide ores than open-pit mines. This is why Chapter 200 had a complete ban on open-pit mining.

On the other hand, Maine allows open-pit mining of granite, gravel, and some other minerals that are non-reactive and less likely to cause severe water quality impacts. Maine has a lot of experience with mining these types of deposits, and generally, they do not cause severe water quality impacts if developers use best management practices.

Today's amendments propose a way to deal with deposits that do not fit neatly into the existing types of regulation, such as the spodumene deposit in Newry. Spodumene is one of the major sources of industrial lithium, along with lithium brine deposits. The owners of this deposit wish to use open-pit mining techniques to remove large amounts of spodumene, and Maine does not have experience with spodumene mining at this scale. The country that has the most experience with mining spodumene is Australia, by far the world's largest supplier of spodumene. Australia regulates spodumene mines as metal mines and requires mining companies to characterize their spodumene deposits before excavating via open-pit methods to ensure that there are not materials cooccurring with the spodumene that would pose a danger to the environment.

That is exactly what the rule changes in front of the Board today would do. They would potentially allow for open-pit techniques to remove spodumene and other non-reactive metallic minerals, but only after characterization shows there is very low risk of environmental and human health impacts due to cooccurring reactive minerals. Today's amendments would also require that applicants provide ongoing water quality monitoring during excavation to help ensure that pre-mining characterization did not miss potential contaminants such as acid-generating minerals.

This is highly appropriate. Again, Maine has no experience with large-scale open-pit spodumene mining, which is why state law now requires deposit owners to characterize their deposits thoroughly before allowing them to use open-pit mining techniques. For example, we know from the very limited public data about the Newry deposit, which is the reason you have today's amendments before you, that there is some galena, or lead sulfide, present in the ore. This mineral has the potential to leach lead, may be acid generating, and often cooccurs with iron sulfide, the major culprit in causing acid mine drainage. We are uncertain if galena is present at levels that are dangerous, but the only way to know would be through detailed characterization of the deposit in the manner that that these rule amendments propose.

Another key reason we supported LD 1363 and support today's proposed amendments is that they require that any chemical processing or beneficiation of ANY metallic minerals would still be covered by the existing Chapter 200 rules. This means, among other things, that tailings impoundments are banned, and only dry stack tailing disposal methods are allowed. To turn spodumene into a concentrate that can be used to make battery compounds, it is necessary to process it with toxic chemicals in a series of flotation tanks. In these tanks, spodumene concentrate floats to the surface and is removed. Waste or "tailings" sink to the bottom of the tanks. Mining companies often dispose of tailings as a liquid slurry in large artificial impoundments. Over time, the risk of collapse of the dams that create these impoundments is significant. When tailings impoundments fail, they often do so catastrophically, polluting many miles of rivers and streams and even flooding entire towns with significant loss of human life.

The chemical processing, flotation, and concentration of spodumene ore would be comparably dangerous to the processing of zinc, lead, or copper ore, and it is thus appropriate that the existing Chapter 200 rules continue to apply to any proposed chemical processing of spodumene in Maine.

NRCM remains uncertain what the owners of the Newry deposit want to do with their spodumene. There were many stories in the press prior to the passage of LD 1363 last session that implied the owners intended to sell into the battery market. This would almost certainly require chemical processing and flotation in Maine, because it would make no sense to ship millions of tons of raw

ore, which is typically 95-99% useless material, over long distances for chemical flotation elsewhere. Australian spodumene mines typically only ship spodumene concentrate elsewhere for processing. Again, this underscores the importance of chemical processing activities remaining under the existing Chapter 200 rules for any metallic minerals. On the other hand, the owners have also said that they only want to ship their raw spodumene ore with the highest levels of lithium to scientific glass manufacturers. This would mean substantially less extraction from the deposit and a lot less shipping of ore.

There is also an additional step in the manufacture of battery materials from spodumene concentrate that involves treatment of the concentrate with acid at high temperatures. Like beneficiation using chemical flotation, this process also uses large amounts of energy and chemicals. It remains unclear whether Maine has an adequate regulatory framework to deal with this sort of facility should one be proposed.

Finally, as it deliberates on these rules, we would ask the BEP to consider the following:

1. **Diverse sources for lithium:** There are two major sources of industrial lithium: brine deposits and spodumene deposits. Interest in developing the spodumene deposit in Newry is what spawned both LD 1363 and today's Chapter 200 proposed amendments. Spodumene mining and chemical processing are significantly more chemical and energy intensive than obtaining battery grade lithium from brine deposits. An emerging technology for extracting lithium from brine, called Direct Lithium Extraction, allows removal of lithium salts from brine without evaporation of the brines and the impacts this can cause to groundwater. Although it is not at commercial scale yet, there is every reason to believe that it will get there.
2. **Current sources of lithium:** The vast majority of the world's lithium, close to 80%, comes from Australia and Chile.¹ Although China processes lithium from many other places and makes a large share of lithium-ion batteries, it produces far less lithium than either Australia or Chile. Because both Chile and Australia are close U.S. allies with free trade agreements, their lithium would be treated as equivalent to domestic lithium under the Inflation Reduction Act.
3. **Many U.S. lithium sources:** The U.S. has many possible domestic lithium sources, including brine sources. The Nature Conservancy produced an extensive report looking at 72 sites in the U.S. Among its conclusions are: 1) the U.S. has enough lithium in the ground or in brine to supply the world for 100 years at roughly current levels of consumption; and 2) the U.S. should focus on developing brine resources using Direct Lithium Extraction rather than on spodumene mining. We urge the Committee to review this report.²
4. **Future lithium needs:** Long-term predictions of lithium demand may or may not be correct, and efficient use and recycling of lithium will lower the need for lithium mining. The Climate and Community Project has written a recent report on this that we also urge the Committee to review.³

5. **Lithium market:** The price of lithium is likely to fluctuate drastically as prices for other commodities do. Prices for lithium have dropped about 80% over the past year and look likely to continue to drop in 2024.⁴

These factors indicate that Maine has time to take a cautious approach to mining spodumene and other minerals the new Chapter 200 amendments would cover. We think today's proposed amendments embody this cautious approach.

Thank you for the opportunity to testify.

End Notes

¹ Accessed at <https://www.visualcapitalist.com/visualizing-the-worlds-largest-lithium-producers/#:~:text=Australia%20and%20Chile%3A%20Dominating%20Global,the%20global%20p,roduction%20in%202022.&text=Australia%2C%20the%20world's%20leading%20producer,mines%2C%20specifically%20the%20mineral%20spodumene.>

² Accessed at https://www.scienceforconservation.org/assets/downloads/Lithium_Report_FINAL.pdf.

³ Accessed at <https://www.climateandcommunity.org/more-mobility-less-mining>

⁴ Accessed at <https://www.reuters.com/markets/commodities/lithium-producer-albemarle-cut-workforce-lower-spending-2024-2024-01-17/>.